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A

TREATISE

ON THE

GROWTH AND FUTURE MANAGEMENT

OF

TIMBER TREES,

AND ON

OTHER RURAL SUBJECTS.

With an Appendix.

ADDRESSED TO THE LANDED PROPRIETORS OF NORTH DERBYSHIRE.

BY

G. W. NEWTON,

J.P. AND D.L. OF THE SEVERAL COUNTIES OF DERBY, CHESTER, AND LANCASHIRE.

LONDON:

LOVELL REEVE, 5, HENRIETTA STREET,

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PREFACE.

THE contents of this volume are the results of my own practice and experience of half a century. Having commenced a rural life at the age of one-and-twenty, I have lived to see, in my seventy-first year, trees planted by myself, and by others under my own inspection, felled and sold for the uses and purposes required by the collieries and the numerous manufacturing establishments of our own and the neighbouring counties. He is highly favoured who is spared to witness such results of his own amusement and occupation in his earlier days. To expect to see a greater maturity than this, is vain indeed, in man, —the days of whose age are threescore and ten.

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Having been born with a strong passion for gardening and planting, and feeling the ruling passion still strong within me in old age, I have employed the time, when the weather has prevented my working out of doors, by recording my own practice and experience, and reducing my notions and observations into shape, in the hope that by condensing my matter into plain and intelligible detail, and within proper compass, it may receive the indulgence of my readers, and excite the nobility and landed proprietary of North Derbyshire to early planting, and the selection of those kinds of trees, the timber of which is best adapted for the uses and demands of our coal-fields and manufacturing districts, and are best suited to our own peculiar climate and its humid atmosphere. Mr. Evelyn complains of the neglect of this in his own time, and justly observes, "There is no part of husbandry

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which men commonly more fail in, neglect, and have cause to repent of, than that they did not begin planting betimes."

To begin then methodically, and with a due regard to all parts of my subject, keeping in view our own High Peak climate, its various soils, and varied aspects of situation, and the comparative elevations of our division of the county generally. I commence by declaring myself as adverse to pruning of timber plants; and to render this unnecessary in future times, I strongly impress on every one who wishes to improve his estate in beauty, shelter, and in value, to act on "the old adage," "If you wish to have big trees, then plant a little one!" And having first placed a good fence to protect the land you intend to plant upon, give to each tree of your selection, liberty to receive the quantity of nourishment from the earth, and to enjoy

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such a proportion of air, as its age and future progress of growth require.

I give here a list of those timber-trees which I have planted in early life, in this county and climate, and have seen felled and sold in my latter days.

Oak.
Ash.
Sycamore.
Larch.
Scotch Fir.

The following I have not planted myself, but found them growing on the lands on which my predecessors had planted them:

Spruce Fir.
Weymouth Pine.
Poplar.
Lombardy.
Willow (Huntingdon).
Beech.
Elm.

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Mountain Ash.
Birch.
Lime.
Horse Chestnut.
Spanish Chestnut.
Hornbeam.
Walnut, and
Alder,

which latter, in many situations, seems indigenous, and freely renews and propagates and extends itself, as in the hamlets of Ollersett and Beard, Whitle and Thornsett, and from which the first-mentioned is supposed to derive its name, and many other townships in the widely-extended parish of Glossop. The first step to be taken is to make good and *safe* fences; by which epithet I mean, that not only should it be "rabbit tight," if a dry stone wall, but built upon a plan and specification which I shall fully explain hereafter, which

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will ensure its standing firm for more than one generation.

Some years ago our horned sheep caused extensive and irreparable destruction on our young plantations by their teeth, and likewise by their wool. The poisonous effect of the latter sticking on a plant is extraordinary. The substitution by the hat manufacturers of Denton and other districts, of that trade, of gossamer bodies for their hat crowns, instead of those of felted wool, and the encouragement of grouse preserving since the late reforms in the game laws, have lessened the flocks of these destroyers of young timber, who will readily scale any of our three-quarter walls, unless they are prevented by an under coping-stone. But of fencing I shall make especial mention hereafter.

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ON THE

GROWTH AND MANAGEMENT

OF

TIMBER TREES.

THE first five kinds of Timber Trees which I have enumerated are, in my opinion, preferable on most of our soils, and for our climate, and our market for Timber before it attains its riper age and greater girth and dimensions; and first,

THE OAK.

Its timber and its bark are less valuable than they were in my earlier days; still its timber commands a better price with us yet, than it

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does in many other parts of England, and I believe the use for which it commands the highest price in the present age, is for the purposes of the coffin makers For in this, as well as in many other counties, it is a strong feeling among families who can gratify the wish from their circumstances in life, that their own last suit, as well as of their relatives and friends, should be placed within an oaken coffin. Therefore as population increases, this is not only the best market as to price, but of proportionate increase and of inevitable certainty—and speculation to any extent in such a commodity could hardly be termed "gambling;" and though the bark does not, nor can it be expected to fetch so high a price as it did in war time, yet the tanners of our day prefer English bark to any foreign substitute which has hitherto been tried to supersede the use of it. And while, in its youth, and before it reaches its manhood, it is in very large demand for use as post-wood for our collieries,

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as soon as its measure suits their purposes; and its lesser girths and dimensions are suitable for the uses of "the Bobbin Turners" and "Chemical Liquid Manufacturers," along with other white-wood timber, as I shall give the price and particulars of hereafter.

It is universally admitted that it is best to raise your oaks from acorns, as it is doubtless to raise the Spanish chestnuts from nuts, as both plants have a tap-root, which it is desirable should not be broken. But this cannot be done universally, because it would be unsafe to trust to one acorn; consequently you must have some plants to spare, and to draw out from those which are sufficient to occupy the space of ground, on which you hope to raise a future generation of English oak for your successors.

I shall submit, in my Appendix, a cheap and practicable mode of raising oak timber from acorns, which I hope and trust some of

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my readers will make a trial of. The expense of preparing the ground, previous to sowing the acorns, as laid down in many works on the subject of planting and pruning, etc. etc., deters many landed proprietors from planting many hundred acres on their estates, from which neither their forefathers before them nor they in their own time have received any rent or benefit whatever. From my own experience, I am inclined to recommend the acorns from distant counties, in preference to our own growth. The chief of my own planting were raised from acorns which I obtained through the kindness of the late George Wilbraham, Esq., of Delamere Lodge, Cheshire, from oaks in the park of the Earl of Fortescue, in Devonshire, who told me he should follow my example on some of his allotments which he received under the award of the Delamere Forest Inclosure Act Commissioner. Those I planted forty years ago or more, having never been pruned or requiring it, are beautiful specimens of growing oak timber; and the oaks in one of

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his Grace the Duke of Devonshire's plantations, with an easterly aspect, opposite Foxlowe, are raised from a sack of acorns which I gave to my lamented friend, the late Philip Heacock, Esq., and sown by him in his own garden at Foxlowe, and were from majestic oaks in the park of J. W. Spicer, Esq., of Esher Place, Surrey. Of the success of raising oak timber from acorns, there cannot be seen a more striking example than at Welbeck, in Notts, where thousands of oaks raised from acorns, of forty years' growth and more, are making a rapid and healthy and vigorous progress from the beds in which they were first deposited. The late most amiable and excellent noble owner of Welbeck, and, as I have been told, of more than half of the county of Ayr, in Scotland, set a noble example to all his *compeers* of planting for posterity.

But during our long war, and our isolated position, the demand for all kinds of timber

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led to its being felled, and the country was denuded of it in almost every part of England, and ours among the rest. The high price of oak and of its bark likewise led to its doom many a noble wood, as I well know and remember, of which I have made note in another place; and I would fondly hope, that before I take my final departure, I may see some preparatory measures commenced at least for renewing these woodland sites with a rising generation of Forest Timber.

The steeps on both sides the Goit, from Goit Bridge to Whaley, were once filled with heavy oak timber, the sale of which, along with other timber, returned to the purchaser of the Taxal estate and his next successor, the full amount of the price paid for the whole estate by Mr. Foster Bower to Mr. Dickenson; the price being £18,000, as I was informed by my late venerable and respected friend, John Philips, Esq., of Bank Hall, near Stockport, the grandfather of Francis Aspinal

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Philips, Esq., the present owner of that property.

The Bings Wood and other adjoining estates of Edmund Buckley, Esq., were formerly distinguished for their majestic oaks and white-wood timber, as was the Bugsworth Hall estate, and especially a large extent of it, Carrington Wood, abounded with oaks of great girth and dimensions. So also were the steeps and cloughs still lower down, along both sides of the course of the same river, until it falls into the Etherow, at the Water Meetings estate, on the property of John Wright, Esq., of Brabins Hall, below Compstall Bridge, especially on the estates of Peter Arkwright, Esq., and formerly of the late Samuel Oldknow, Esq., and the Brabins Hall woods especially, both in Marple. The shaft of the great wheel placed in Mellor Mill by the latter in 1790, the date of its completion, was made from an oak felled on the property, which bore incontestable proof of its having

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sprung from the stool of an oak, its previous occupant of the land, as I was informed by Mr. Joel Howard, of Marple, formerly a timber valuer and timber merchant of extensive trade and respectability, who valued the lot of which the tree in question was a part, together with the rest of the lots, before they were submitted to public competition "by Ticket." And one of the finest oaks I ever saw in either county, grew on the Brabins Hall estate, which the owner most reluctantly removed, as it was in the way of his proposed enlargement of the hall, and its being indispensable for an extension of the suite of drawing-rooms.

The course of the Etherow from Woodhead to Compstall on both its sides was enriched in appearance by the roughs, steeps, and dingles, filled with oak and white wood of great size of different kinds of timber; and the Arnicroft wood was a splendid sight to behold. When I was in my boyhood, and at the com-

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mencement of those improvements and development of the estates, value, and capabilities, designed and executed by the late Matthew Ellison, Esq., of Glossop, who lived to see his employer's estates thrown into communication with the neighbouring manufacturing districts by the turnpike-roads, of which he was the author, and the great moving power which effected their completion. His foresight and judgment has resulted in the vast manufacturing wealth and activity which now exists and is now to be seen "in entire Glossop Dale." But such firmness of purpose, such integrity, and such sound and clear-sighted views as to the capabilities of his employer's extensive property, and such determination to lay them open, are only to be found in such men as he, and can be best appreciated by those few who still survive, who can remember what Glossop Dale *was*, and what Glossop Dale *is now*,—one of the most splendid instances of the consequences of judgment, integrity, and perseverance in

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an agent, and well-placed and well-merited confidence in the employer.

In other parts of the division, as on the course of the Derwent, oak and other heavy timber of various kinds adorned its banks and steeps and slopes on every side; and there is a tradition, as related to me by the late Samuel Frith, of Bank Hall, that there was formerly an extensive fall of oak in the woods at High Low, in the parish of Hope, before the estate was purchased by the father of the late Duke of Devonshire, from the trustees for sale under the will of John Archer, Esq., a gentleman of fortune, residing in Essex, about 1804, the timber of which was sold to Government, and was used in the building of a man-of-war, 'The Royal George;' and the last fall took place a few years before it was sold to the Duke, and the old woodmen described the trees as being almost of a fabulous size.

I am inclined to think that the nearest

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point at which this timber could be conveyed away by water-carriage must have been Gainsborough, and from thence on the Humber to Hull, for shipment to the dockyards.

The 'Royal George' was launched in 1755, and bore the flags of Lords Anson, Hawke, and Rodney; of Admirals Boscawen, Sir John Lockhart Ross, and Kempenfelt: and went down at Spithead on the 29th of August, 1782, when nearly 900 perished.

The largest extent of land covered with oak and ash and other white-wood timber in our vicinity, is in the adjoining northern division of the county of Chester, the Middlewood coppice in Norbury, on the estate of William John Legh, Esq., of Lyme. This noble wood, when the present owner's grandfather succeeded to the Lyme estate in 1794, on the death of his uncle, Peter Legh, Esq., was full of heavy timber, and it was felled soon after he came into possession. It contained 999

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large oak-trees, exclusive of white wood and ciphers, as one of the men who assisted in the felling and peeling informed me. There was also a fall in it in 1834–1835, by the late Thomas Legh, Esq.

On the former, and likewise on the latter occasion of felling the oak timber in it, great care was taken and judgment evinced by the agents in preserving the stools, by leaving them in a form and shape as to prevent their receiving injury from the effects of wet weather, by which a future stock and succession of saplings has been secured and is now making rapid progress. It contains 60a. 38p. statute measure. Besides the large proportion of oaks which it at present contains in a most thriving and healthy condition, it abounds in white-wood timber of every description,—ash, alder, willow, mountain-ash, and birch, for all which timber in its earlier stages of growth there is a ready sale in the neighbouring manufacturing districts.

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There is another site resting on an elevated part of the extensive park at Lyme, with a northerly aspect, called the 'Lantern Plantation,' forming a striking feature, rising as it does immediately at the back of that noble mansion: so called from a building within it, now almost buried among the trees which surround it, and is of as ancient date, or more so, than the more conspicuous edifice and landmark 'Lyme Cage.' It contains 33a. 2r. 28p. statute measure. The lower part of it was planted probably about 1800, or not long after, by the guardians of the late Thomas Legh, Esq., chiefly with fir timber. The upper part of it was planted by the late Mr. Legh himself, in 1818–1819, and in both instances a greater proportion of firs over other trees were planted. This would have been an excellent site for the growth of ash and sycamore in preponderance, with a sprinkling of larch, Scotch and spruce firs, as ornament.

A plantation of still more recent date has

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been formed at the bottom of the park, at the base of 'The Elmerhurst,' which beautifies the approach up the rising ground of the carriage-road to the hall. Formerly the park surrounding this noble mansion was clothed and embellished, like Needwood Forest, with stately oaks and hollies. The former have entirely disappeared (with the exception of two or three ancient relics of them near the Old Park entrance) from sheer old-age I am inclined to think, and no care taken to raise a fresh generation, except on 'The Elmerhurst,' where a number of single oaks were planted, but have been destroyed, for want of sufficient protection, by cattle. The hollies were swept from the park's surface at a more recent date, about the same time that the fall of timber took place in Middlewood, by bird-lime makers, who came from some distant place, and took up their abode, in gypsy-like encampment, in or at the outskirts of the park, until they had finished their operations in the manufacture of bird-lime. Of those

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oaks which still remain, some bear the marks of age and the effects of lightning, to both of which they owe their stag-horned branches and antiquated appearance.

The least expensive mode of restoring its sylvan character and beauty to this noble park would be a cheap and simple one, though not a speedy one, and must be undertaken as a pleasure and amusement, and with the same feelings and motives by which the Earl of Carlisle was animated, and be content

" For his own posterity to perform the same ;"

and might be commenced by sowing a circumference of land with hollyberries, and after they had reached the height of 18 inches from the ground two or three acorns might be placed in the centre with the dibbling-iron, and the strongest plants left to grow if they escaped the ravages of mice. Twenty such or less on a statute-acre, in different and proportionate chosen sites, in a nobleman's or a gentleman's

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park, single or in groups, as "effect in appearance would suggest," would be sufficient for its ornament, and any formality in placing them should be carefully avoided.

I am inclined to think that the growth of hollies raised from the berry would keep in sufficient advance to protect the oak raised from the acorn; for both would give proofs, in their respective progress, of the advantage of undisturbed fibres in the one case, and unbroken tap-root in the other. These circumferences should not be too much circumscribed, and might be protected easily by having thorn boughs around them to keep off cattle. This is a tardy, but it is a cheap and simple plan; and it is the expense of planting which deters many landowners from planting. "Why don't you plant such and such sites or hillsides on your estate, not producing a shilling a year?" I have often asked. "*Because I can't afford it,*" is invariably the answer; *or*, "I know nothing about the planting or

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growth or treatment of timber trees." Imagine the owner of a fine estate in Devonshire, Somersetshire, or Wilts, or Hants, avowing his ignorance on such a subject. What stronger proof would you require that such a novice has always a heavy balance in his favour at his bankers?

Next to the oak, in my classification, is

THE ASH.

This most useful and quick-growing tree is not so much sought after, nor so high in price as it was before the railways became the general mode of travelling and channels for public traffic, and consequently less of it made use of for wheelwrights' purposes. Still it cannot be dispensed with in any part of England, as, for instance, for cart felloes, the hafts of spades, forks, mattocks, and other tools; for the bobbin turners, for crate wood, for the hoop and hurdle makers. It will

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attain a great size on dry land, as well as in damp situations, as I can speak from my own observation and experience. There are some of gigantic proportions of it, and extraordinary soundness, in many parts of Norfolk, which I have spoken of elsewhere, with the amount of loads of timber contained in one instance, especially in that county.

I must next speak of

THE SYCAMORE,

and at greater length, and I entreat those of my readers who are proprietors of land in North Derbyshire, who are on the right side of the meridian of their age, not to let slip another planting season before they plant extensively of this most valuable and indispensable timber-tree, for the growth of which both the Low Peak and the High Peak are alike most suitable in their soils and climate.

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Among the many and various kinds of timber imported into this country from Norway and Sweden, America, or any other country, "none has yet supplanted the sycamore." No foreign timber has hitherto been found as a substitute for sycamore, for the uses of the calico printer, for his blocks for printing, his rollers, his squeezer bowls, nor excelled it for the wood engravers. For kitchen dressers it stands equally unrivalled. It is extensively used in the fittings-up of our merchants' counting-houses, wherever it can be obtained, and its smooth surface and durability render it most useful and valuable for all these purposes; and it is again most seviceable from its being so easily kept clean, and it is now more scarce, and commands a higher price in the market, than any other timber now required in the manufacturing districts. It will at any time command five shillings a foot if of very large dimensions. Indeed, it is scarcely to be found within any reasonable distance from those districts wherein it cannot be dispensed

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with, except from Wales, from whence it is brought to Stockport, Manchester, and all other adjacent manufacturing towns, by railway, and I have no doubt that, for the next half century or more, the Manchester and other customers, as I have described, must rely on the Principality for their future supply of this indispensable timber; for there are none left within thirty or forty miles on any side of Manchester, and beyond that distance southward the tree is seldom seen, and in many counties it is very rarely met with, and if growing, in few instances is its value known, or not duly appreciated, and it shares the fate of every other kind of coppice timber, and sold for faggot wood. I was told a short time ago by some eminent nurserymen and foresters in Suffolk and Norfolk, that they had ceased to raise it among their other nursery stock, on account of the little inquiry they received for it from their customers. It would seem that the cold climate of our Low and High Peak districts, and the dry soils of

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many parts of these are the most congenial to the slow growth and general character of sycamore, from the large supply of it which has been obtained during the last thirty or forty years by the timber dealers who trade in it, for the manufacturing towns before mentioned.

About half a century ago it might be seen in fine specimens ornamenting the farm and other dwellings in some of the most exposed situations and coldest districts of our division of our county, attaining great size, (and excelling, in quality and soundness, the sycamore obtained from more distant counties,) as in Fairfield, Peak Forest, Wormhill, Blackwell, Pig Tor, King's Sterndale, Taddington Flag, Chelmorton, Hardlow, Hucklow, and many other of our own Arcadian plains. Our forefathers cherished its growth around their homesteads, and were attached to the tree, from the beauty of its foliage in summer, and for its friendly succour in the winter months,

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by its defiance to the storm from every quarter. But it has of late years disappeared from the scene of its former days, and has ceased to breathe the pure air of a limestone or gritstone plain or sloping dingle, and has met its doom on the stools of the blocking-room or in the heated atmosphere and odoriferous vapours of the washhouse or drying-rooms of the calico printer.

LARCH FIR.

Too much cannot be said in recommendation of this kind of fir timber, and it is especially adapted to the Peaks of North Derbyshire, always bearing in mind soil and situation being suitably fixed on. It will be profitable to grow it in some situations as a timber crop by itself. I am disposed to think so, from instances which I have seen in Ladbach Clough in the Taxal plantations, and in Hampshire, between the town of Liphook and Pe-

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tersfield in that county, nearest to the latter place on the direct turnpike road to Portsmouth; and when intermixed with other timber in plantations, it affords an agreeable contrast of light to the more sombre shade of its kindred Scotch and spruce firs.

As a timber, larch fir is most valuable for various purposes, especially in our division. It is in great demand for post-wood for the collieries: by many it is preferred to oak for colliery purposes, and for spars for the roofs of buildings, after being peeled and squared. I have never used any of it myself for other purposes than these I have named, but I believe it has by many been used as bearing-timber in barns and farm buildings in my own neighbourhood. If intended for railing, it should by all means be peeled, for if not, the wet gets in between the peel and the wood, and it soon perishes. Nothing can be more unwise than to plant larch too thick anywhere, especially in any low or sheltered

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situation, for our frequent heavy and drifting snows in winter are carried by the storm into and lodged among the crowns of such a mass of trees, and it not unfrequently happens that, after a thaw has come on and lasted a few days, a reaction of frost takes place and hardens the snow which remains, and which may not melt again until the spring, or even until the summer in such a climate as ours, and then the melting snow saturates the crowded trees from top to bottom with water, and there is neither sufficient sun to dry them nor any current of air to drive it out of them, and speedy destruction is the inevitable consequence.

The larch, of all trees, will not bear the pruning knife. Its branches, as the growth of the tree progresses, *as high up as decay is shown*, after having performed their office, should be rubbed off gently by the blunt edge of the axe, but "not the breadth of a hair" beyond that.

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The railways have given a new demand for larch timber, as sleepers, which have superseded stone blocks for the rails to rest upon. The principal, I may say only supply of which has been obtained from any of our localities, is from the Taxal plantations, out of which many thousands have been supplied to various railway contractors, and in one instance ten thousand of these have fetched one pound a tree, to be cut in proper lengths as sleepers. Many thousands more still remain in the same plantations, which are the only supplies of larch I know of on our side of the backbone of England.

Large quantities of it, I am well aware, have been brought out of Yorkshire for railway sleepers and for colliery post-wood, and a still large, if not inexhaustible, supply of it may yet be relied on for some years to come from the estates of Sir John V. Johnstone, Bart., and other landed proprietors in that county. But with the exception of Mr. Jod-

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drell's, I know of no other extensive plantations which are in many parts of North Derbyshire which could supply sleepers for twenty miles of future railway, within us or within reach of us, nor one-half of the collieries of Hyde, Dukinfield, Ashton, Oldham, or Hollinwood, with post-wood for six months certain, so deplorably has the growth of this kind of fir timber been neglected for the last century among us. Similar neglect or mistakes have been made and occurred in other districts.

As on the London and South-western Railway, many miles of which pass through forests of Scotch fir, and scarcely one larch to be seen amongst them, as thinly spread as I am told the giant mahogany-tree is seen growing amidst the forests of Honduras; and yet wherever a larch has been placed, and has had a fair chance, it has shown proof that it would be a profitable timber to occupy those situations. What timber their sleepers are

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of I know not, but probably of Scotch fir *Kyanized*, as is the case, I believe, on the "Direct Portsmouth" line of railway, which passes through many miles of Surrey and Hampshire, abounding with Scotch firs, and yet there is a plantation consisting of larch only, which I have already made mention of, within a very short distance of the line, of many acres, which prove incontestably that it might be grown to great profit there, as elsewhere, though the trees here were planted too thick upon the ground at first, and have not been thinned at all since they were first planted, consequently they have not attained that girth and dimensions as to be applicable for the uses nor suitable for a market, if I may so express it, brought home to them. When I see instances of such stupid ignorance or gross neglect, I liken it to the folly of overstocking your common-land with too many geese, or your parks or grazing pastures with too great a number of sheep, deer, horses, or horned cattle.

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The Taxal estate was purchased from John Dickenson, Esq., of Birch Hall, near Manchester, by Foster Bower, Esq., a barrister of great eminence in his time, who made it his country residence. He let the planting of Taxal Edge, the Hough Moor, and Ladbach Cloughs,—in all, one thousand acres,—to a Scotch forester, at a certain price per acre, for the plants and planting of them, of which about four hundred acres were planted in his lifetime; when he was seized with a sudden illness, which ended fatally, while he was on the Circuit during the Assizes at Chester. He died intestate, and his elder brother, John Bower Joddrell, Esq., of Yeardsley, took all his personal and real estates, who, not having the same taste for planting, was desirous to be released from this contract, but not being able to effect this, the planting of the remaining six hundred acres was completed.

More judgment, in my opinion, might have been exercised by the forester, or insisted

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upon by Mr. Bower Joddrell, in the choice of aspect for the various trees to be planted. Large extents were planted with larch-fir, which, being placed in sheltered and suitable situations, have produced great returns in the lifetime of the late owner of the estate, John William Joddrell, Esq., of Yeardsley, recently deceased. But on the westerly aspects, along the entire range of the back of this large extent of plantation, thousands of Scotch firs which were planted on this aspect have fallen victims to westerly winds and to time, affording, while they remained, an unsightly spectacle of crowded and stunted dwarfs, of hobgoblin forms, until vegetation became extinct in them. Had this extent of land on this aspect been planted with sycamore instead, what different results might have enriched the present proprietor by a fall of that kind of timber of so many years' growth!

The upper part of Ladbach Moor was set on fire during my tenancy of it, accidentally

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as we supposed, by the heath on which the plants had failed to grow becoming ignited by the embers of a burning tobacco-pipe left by some furtive besom-makers. The flames burst forth about half-past eight in the evening, and were fortunately seen by my underkeeper, who lived close under Taxal Edge. He gave us the alarm, and we all turned out in as strong muster as we could and got to the spot, alarming the tenants in our way. Providentially, by a strong north-westerly wind the flames were driven in the direction of Ketleshulme and Saltersford, which prevented the fire from extending itself inwardly towards the planted part of the moor, and before daylight we succeeded in arresting its further progress, and it was finally beaten out and extinguished by morning.

SCOTCH FIR.

I have planted many Scotch firs myself, and they recommend themselves by their ever-

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green beauty, especially in winter when interspersed among other hardwood trees, which ought, as I contend, to form the belt of every plantation, either on steep or level,—the ash on the northerly, and sycamore on the easterly and westerly aspects. Of its durability as timber I have had no experience; I found many, planted by my predecessors, which had evidently done growing, and, having been placed with a direct westerly aspect, though many of large size, did not give me a very favourable opinion as to their worthiness to be substituted for foreign deal in my own buildings, and I sold them, as we are some of us wont to do when we suspect a horse shows signs of throwing out a spavin, or becomes queer in his eyesight. Still this timber, if grown in other parts of England, is probably far superior in quality than mine was, and every way deserving of the good name which Mr. Pontey gives it.

The largest trees which I have seen of its

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kind are some majestic ones in Sir Henry Fletcher's, Bart., park, at Ashley, Walton-on-Thames, wherein there is a heronry. The most perfect tree, though not the largest, that I have met with is growing in the Earl of Roseberry's park, at Bixley Hall, Norfolk, beautifully straight,—still more beautiful from its smooth, bright cinnamon bark,—and evidently containing a great many feet of timber in it; and I should prefer felling such while the sap was active.

SPRUCE FIR.

I should not venture to plant this species of the fir tribe unless I could give it, in such a climate as ours, a good situation as to soil, and a southerly or easterly aspect. It was planted extensively on some parts of the Taxal plantations, and flourished healthy and luxuriant among oaks on these aspects during the seventeen years of my residence there, about the close of which these evergreens

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were removed from their hard-wood neighbours to give more room for them.

WEYMOUTH PINE.

This species of fir is little known among us; in Surrey and many other counties in England it flourishes and is highly ornamental.

POPLAR.

Black Italian. This free-growing, useful timber tree requires no particular notice from me. It recommends itself by the not far distant return it makes to the planter, and the various uses for which its timber is applicable; and there are very few of our localities where situations are not to be found whereon to grow it profitably and without its interference with anything growing near it.

LOMBARDY POPLAR.

A lofty tree with spiral crown tapering from its base upwards. I am not aware of

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any valuable property which this timber possesses. The finest of these I ever met with were growing fifty years ago, in Nuneham Park, at the entrance gates, in those days the seat of Earl Harcourt.

WILLOW, (HUNTINGDON.)

This is a very profitable timber from the quickness of its growth, and for the many purposes to which in a few years it becomes applicable, being in Huntingdonshire and Cambridgeshire, and many other counties, grown as pollards, the poles of which are sold to hurdle-makers or hop-growers; it is also used for the rims of riddles, and for cart and wheelbarrow side boards, and it indents without splintering from blows or hard usage, and had not wood pavements been abandoned would have formed more durable blocks for such paving than any other timber, "if a sufficient supply of it could have been obtained," as the late Mr. George Stephenson

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observed to me when I stated my opinion to him of this timber as paving-blocks; and I may further observe on this part of my case, as "Huntingdon willow" Mr. Pontey thus speaks of it (*vide* page 68):—"This plant, though well known as a pollard, has been very little cultivated as a timber tree, which shows the supineness of mankind in regard to the properties of many kinds of wood. There is, besides, an objection to this willow, that it usually divides itself into a number of large arms," etc. etc. And further, "I do not remember to have seen a rood of it growing anywhere as timber," etc. etc. On which I may observe, that the largest and finest timber of this willow that I ever met with were growing more than fifteen years ago, at Southam, in Warwickshire, in a fence at the very outskirts of the town, on the Leamington road, immediately above the ditch which received the town's sewerage. There were about half-a-dozen large, heavy trees. On my stopping to inquire whose property

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they were, I was told they belonged to Mrs. Abernethy, the widow of the eminent surgeon of that name. Probably, long ere this, death and the Sanitary Reform Act have dealt alike fatal strokes to the willows and their venerable owner.

BEECH.

This is not a tree to plant extensively among us. Here it is ornamental as a single tree; or, with a like view, if planted for variety's sake, among a motley group of other kinds, in park or pleasure-ground. In Hertfordshire especially it reaches perfection, and is applicable to many various uses in London, and is extensively used in its application to carpenters' tools and the uses of many other handicraftsmen.

ELM.

The same remarks are as applicable to this as to the former, as timber. Besides, I know

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from experience, that at the age of forty or fifty years it will decay with us, as was the case with a large number which were planted by my predecessors in the township of Whitle, in this county, though on good dry land, and a (very nearly) southerly aspect, and which, had I not removed them, would very soon have been altogether valueless.

MOUNTAIN-ASH.

A hardy tree, and well adapted to our climate; though not very valuable as timber, yet is very profitable as coppice wood in every part of England.

BIRCH.

This is a very useful timber, and well suited to the climate of North Derbyshire. Its boards are used by wheelwrights for carts, wheelbarrows, and coal-pit tubs, and it is in universal demand for clog soles for the work-

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ing classes in colliery and manufacturing districts; and the trunk, or bowl, if of sufficient girth and dimensions, is admirably adapted, and commands a very high price by wheelwrights, for "timber bolsters."

LIME.

This is by no means a profitable tree to plant in this part of England. It is very ornamental in and suitable for many and appropriate situations, as avenues, cemeteries, and churchyards; but its timber I cannot pronounce as profitable. It used to be in demand by Broadwood and Co., and other pianoforte-makers. I once sold a good many large trees of it, but with difficulty, and the purchaser of them told me that, unless he could get a large order for wooden legs, he feared he should not be able to dispose of them otherwise.

HORSE-CHESTNUT.

An ornamental tree, and much prized for

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the beauty and abundance and fragrance of its blossoms in spring, and seen to the greatest advantage in the avenues of Bushey Park. There is a scarlet-blossomed horse-chestnut likewise, which is very beautiful in spring when planted in contrast with the former. Some very fine trees of both these, thus planted in contrast with each other, are growing in Ashley Park, near Walton-on-Thames, Surrey, the seat of Sir Henry Fletcher, Bart.

SPANISH CHESTNUT.

This timber is said to be more durable than oak, and is supposed to be that used in the roof of Westminster Hall. I have known instances of its durability as park paling when oak of the same date of being used had for some time been in a state of decay. This was the case, I know, when I resided at Taxal, at Henbury Hall, near Macclesfield, in Cheshire, the seat of Edward Marsland, Esq., where many yards of paling of this

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timber, evidently of great antiquity, remained where first impaled, while adjacent parts of oak paling, which had evidently been renewed, were of more recent workmanship.

I planted two Spanish chestnuts more than forty years ago: one was a misshapen plant, but if allowed to remain will straighten yet, in time, into shape; the other I put in with my own spade also, is a beautiful plant of that age, as straight as an arrow. A fine, shining (a *rind almost*) bark, and a healthy and flourishing crown upon it, prove to me that this kind of tree will not disappoint the hopes of the planter of North Derbyshire, or of those who follow him.

Miller, in his work, published in 1748, thus observes on the Spanish chestnut:—"The first of these trees (*Castanea sativa*) was formerly in greater plenty amongst us than at present, as may be proved by the old buildings in London, which were for the most part of this timber; and in a 'Description of London,' written by Fitz-Stephens in

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Henry II.'s time, he speaks of a very noble forest, which grew on the north part of it. "Proximè," says he, "patet foresta ingens, saltus nemorosi ferarum, latebræ cervorum, damarum, aprorum et taurorum silvestrium," etc.; and there are some remains of old, decayed chestnuts in the old woods and chases not far distant from London, which plainly prove that this tree is not so great a stranger to our climate as many people believe it to be, and may be cultivated in England to afford an equal profit with any of the larger timber trees, since the wood of this tree is equal in value to the best oak, and for many purposes far exceeding it; as particularly for making vessels for all kinds of liquors, it having the property, when once thoroughly seasoned, of maintaining its bulk constantly, and is not subject to shrink or swell, as other timber is too apt to do. It is also very valuable for pipes to convey water underground, as enduring longer than elm, or any other wood.

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HORNBEAM.

This tree, which I was told by the late Dr. Lipscombe, Bishop of Jamaica, strongly resembles the mahogany tree in its branches and its foliage, is ornamental as a single tree, but of very slow growth. As a plant it is frequently as crooked and distorted as possible, very like a corkscrew; but it gradually, but very slowly, straightens, and when full-grown is as straight as any beech-tree. This I know, having planted two of them,—one of which remains, is a growing proof of my assertion. It retains its leaves longer than any other timber, and hence has a chilling appearance in a late spring.

WALNUT.

This is a tree of very slow growth in our climate, and not often seen in this division. A few were planted by my predecessors, three of which still remain, but their growth has

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been slow, and though they frequently bear fruit, being sixty years old, the walnuts, even in the finest summer that I ever saw, never grew large enough even for pickling. Some were planted a few years earlier than these I speak of, by the late Samuel Oldknow, Esq., on the Cheshire side of the river, in Marple, opposite to "Mellor Mill," and are still growing where he planted them, and they have made greater progress than mine; still I doubt if their fruit will ever reach maturity, though the timber will every year, though very slowly, increase in dimension.

ALDER.

This timber is applicable to many of the same purposes as the birch, and is too well known for its quick growth and wide-spreading increase in many of our localities, to require any particular notice in this place.

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FENCING.

HAVING spoken of forest-trees in general, and particularized those which I have found best suited for our climate and adapted to our market for timber of every age, and will repay the planter or his posterity or successors, I next speak of FENCES.

For a green or growing fence quicksets are best if you intend to keep them clean and free from weeds afterwards, which can easily be done, "if by a stitch in time you save nine," by strewing a thick covering of spent bark on the top of the copse you plant your thorns in, and check the weeds with the hoe when they first appear above-ground.

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There are other fences where ornament is an object, such as a single row of alders where the land is wet or inclined to be damp, or of beech or hornbeam if the ground be dry. The latter is the more hardy and perhaps better suited to our climate, but it retains its leaves very late in the spring, which is objectionable with some, especially as a fence for a flower-garden.

But the fence which is so generally seen with us, is "the dry stone-wall fence," and is greatly to be preferred among us for many reasons.—First, it occupies less space of ground than a green fence; secondly, it affords no shelter for sparrows and seed-birds; and thirdly, it contains within itself materials for its repair or reconstruction. If it falls to the ground, which is very likely to happen if the work is let by the rood to an inexperienced hand, at a low price, and to one who is not a "regularly educated waller," not bred and born in a stone-wall county and

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is not lineally descended from a stone-waller parent.

There is no part of husbandry in which, in my time, the landlords of North Derbyshire have been so cheated (and it is a bold assertion, numerous as the instances of this kind are, as most landowners know to their cost) than in fence-walling, and it is very often the employer's own fault. Every man who finds his employer niggardly in his price for labour, or finds that he has made a bad bargain for himself, will take care of himself by tempering the work to the price that he is to have for doing it, or "tempering the work to the salary," as a stone-mason observed to me, who was a candidate for the situation and appointment as a county-bridge surveyor; and I have known many such instances in stone-walling, and in stone-draining also, before the blessings of tile and pipe draining dawned upon us. The sough was laid, covered, and filled up out of sight of the employer; the

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fence-wall was completed from the base to the coping-stone, to the delight of the absentee proprietor, who came to see it all "measured up" and to pay for it. But the benefit of such husbandry, or "improvement," was of a very transitory character indeed. The first severe hurricane of wind, or breaking up of a long frost and drifted snow by thaw, very soon blew up the one and blew down the other of these improvements.

In our own hamlets I gave such walling upon and below the surface, the appellation of walling "running-measure," and avoided it as follows.—When I had one entire length of fence to make, say half a mile in distance, or any given space of ground to enclose, I laid the foundation of the intended fence from one end to the other, and raised the first story of my wall to the height of eighteen or twenty inches from one end to the other, and followed the same rule in laying my first tier of "throughs," or binders, and all

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the other tiers or courses of throughs above them, each row tapering as the wall rises in height. The foundation and groundwork having been levelled and made good, let a heavy flat stone be laid projecting about two or three inches from the front of the first courses of strong heavy stones laid above it. Let the entire wall, from end to end, be raised to the height proper to receive the first course of binders, which should be level with the front, but may project an inch or two at the back, of the fence. In raising the fence, care should be taken to fill up the inside with broken stone, so as to leave not even room for mice or weasels to breed inside it, or to allow the wind any access to it; this should be done in solid, well filled-up, dry stonemasonry. When the structure has reached the height of eighteen or twenty inches more, well filled up within, let the second tier of binders be laid as aforesaid, not immediately above the lower tier, but at alternate distances above, or mocking each other.

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By the time you come back to the first stone of your walling you will find it has settled, and may perhaps, here and there, require a little fettling in odd places before you begin to raise your second story. You must follow the same specification in your third or *fourth* course of binder, if your foundation is wide enough and strong enough to bear it, and your wall's intended height should require it. When the wall has been raised to its proper height to receive the coping-stones, let it be prepared suitably with some smooth and flat bedded stones, on which your *under* coping-stones are to rest, which should project three or four inches in front of the wall below and the coping-stone above, and upon these lay your coping-stones in good tempered mortar. Lime-ashes I never used, and, now lime is less than half the price it has been in my time, I should not recommend its use in this case. The coping-stones should be flat-bedded on the under-

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side and rounded at the top; and more than one generation will have passed away before a wall thus put together has tumbled to pieces.

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SITES FOR PLANTING.

Mr. Pontey, in his work, published in 1809, page 90, recommends planting on steeps as being superior to levels in the five following respects:—1st, "They admit of a greater quantity of trees being planted upon an acre, or otherwise (which is far better) they allow every one an increased quantity of surface." 2ndly, "Trees planted on steeps have likewise an increased quantity of air." 3rdly, "On steeps trees are more sheltered than on levels of equal elevation." 4thly, "It appears that by planting on steeps more of the adjoining lands will be sheltered, than by planting the same quantity of land on a plain." 5thly, "Because of their ornamental appearance."

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I have planted a steep, at the onset of my planting, as described by Mr. Pontey,* the aspect of which is due south, and I join in his recommendation of such sites, and the face of it is concave and convex. (See page 94 of his work.)

But I added a breadth of land on the entire length of the northerly side of this steep, on the flat or level immediately above, and overhanging the crest of this steep, which has fully answered my expectations, occupied by a belt of *ash*, planted five rows deep, not in formal lines, but "mocking each other," and a proportion of larch and Scotch firs interspersed among them, for winter ornament and variety; and I strongly recommend this to be done, if practicable, in any planting or replanting of steeps hereafter, and I have given drawings of some plantations situate on

* The steep here spoken of is the Hollinhurst and Pingot Plantation, of which a drawing is inserted and the contents of its acreage stated.

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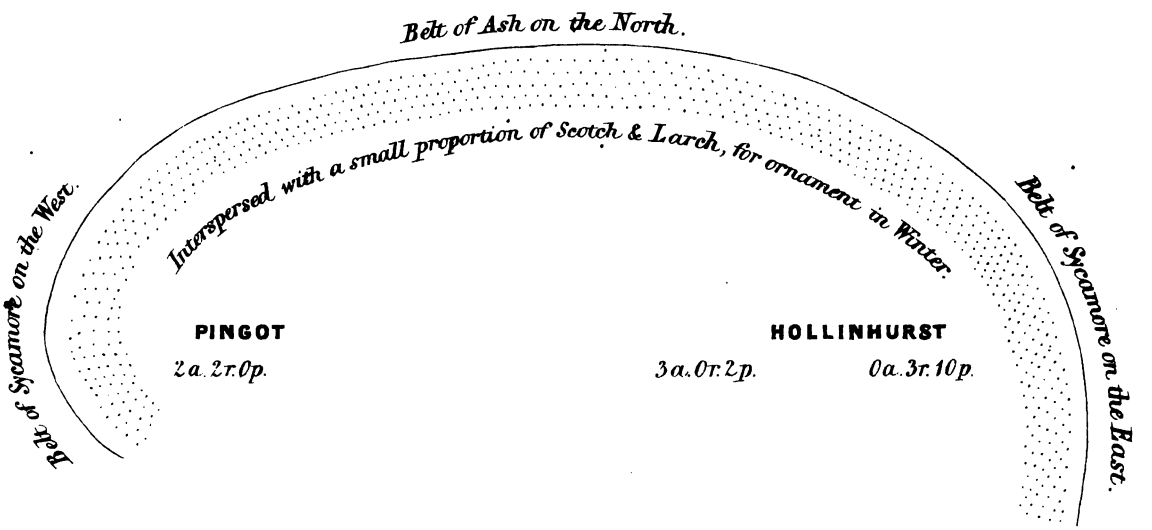
The belts consist of Trees 5 deep, "mocking each other" placed 6ft. distant from the Wall.



THE SKETCH OF THE HOLLINHURST CLOUGH PLANTATION IN OLLERSETT HALL ESTATE.

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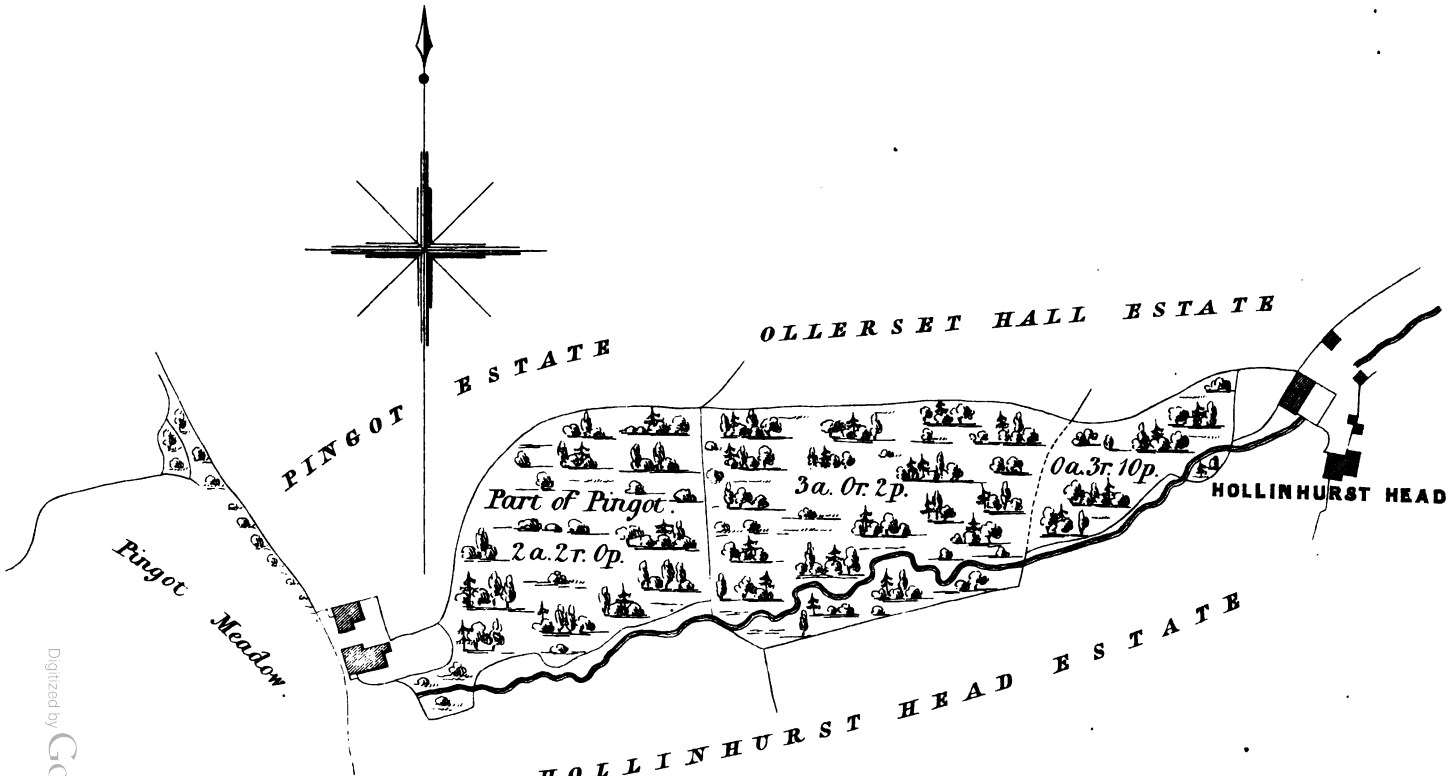

Scale. 4 Chains to an Inch.

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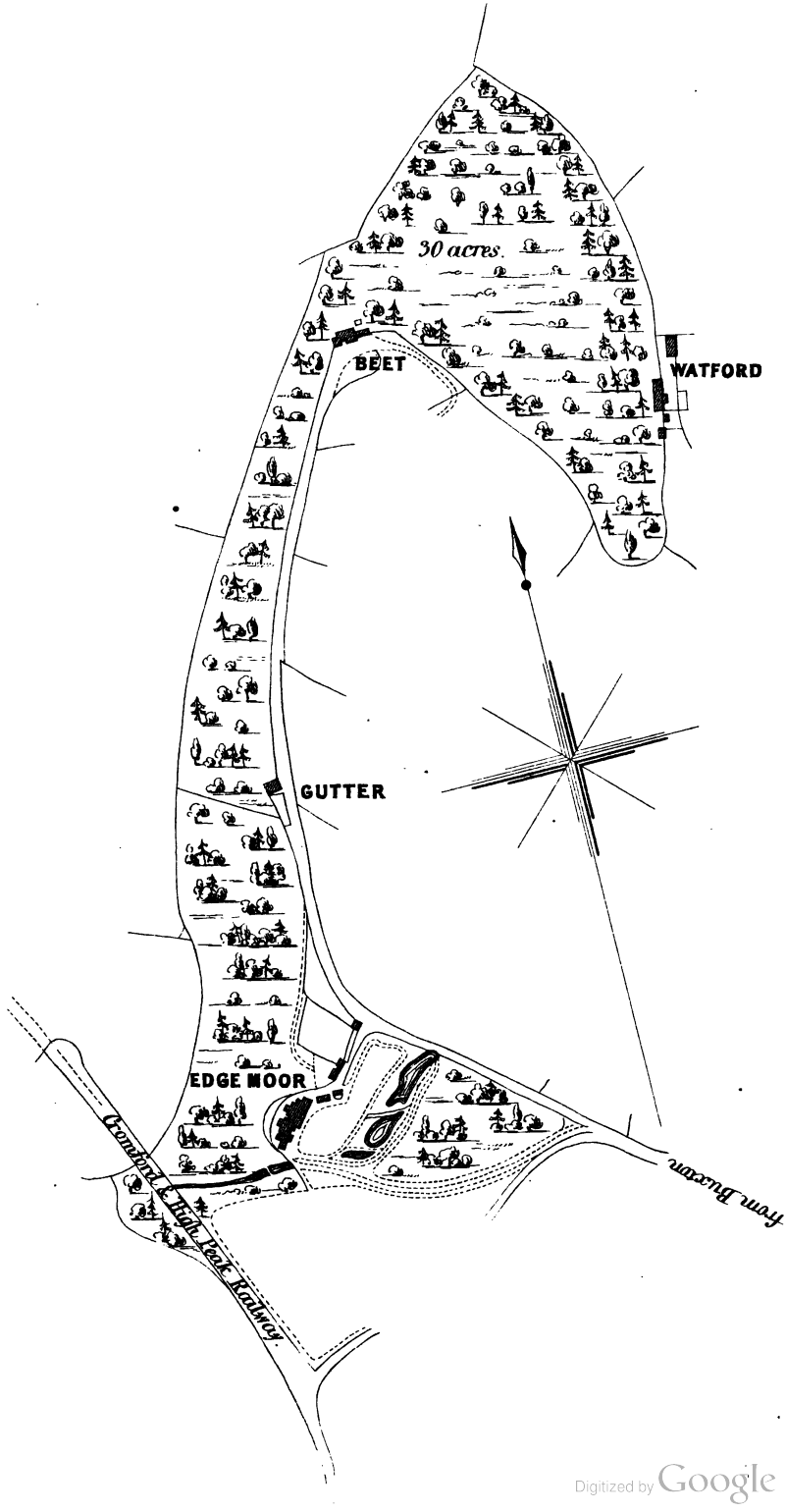

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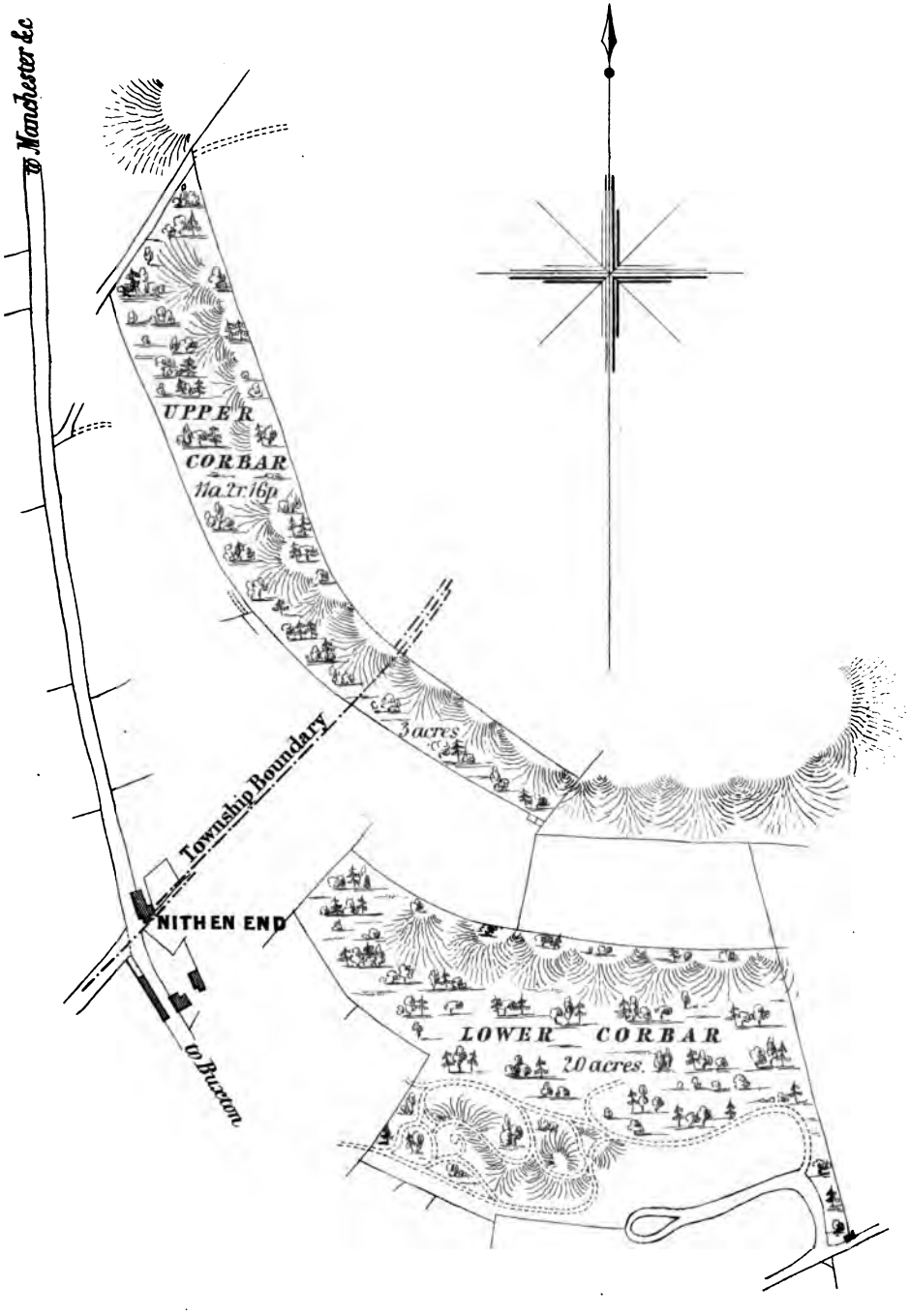

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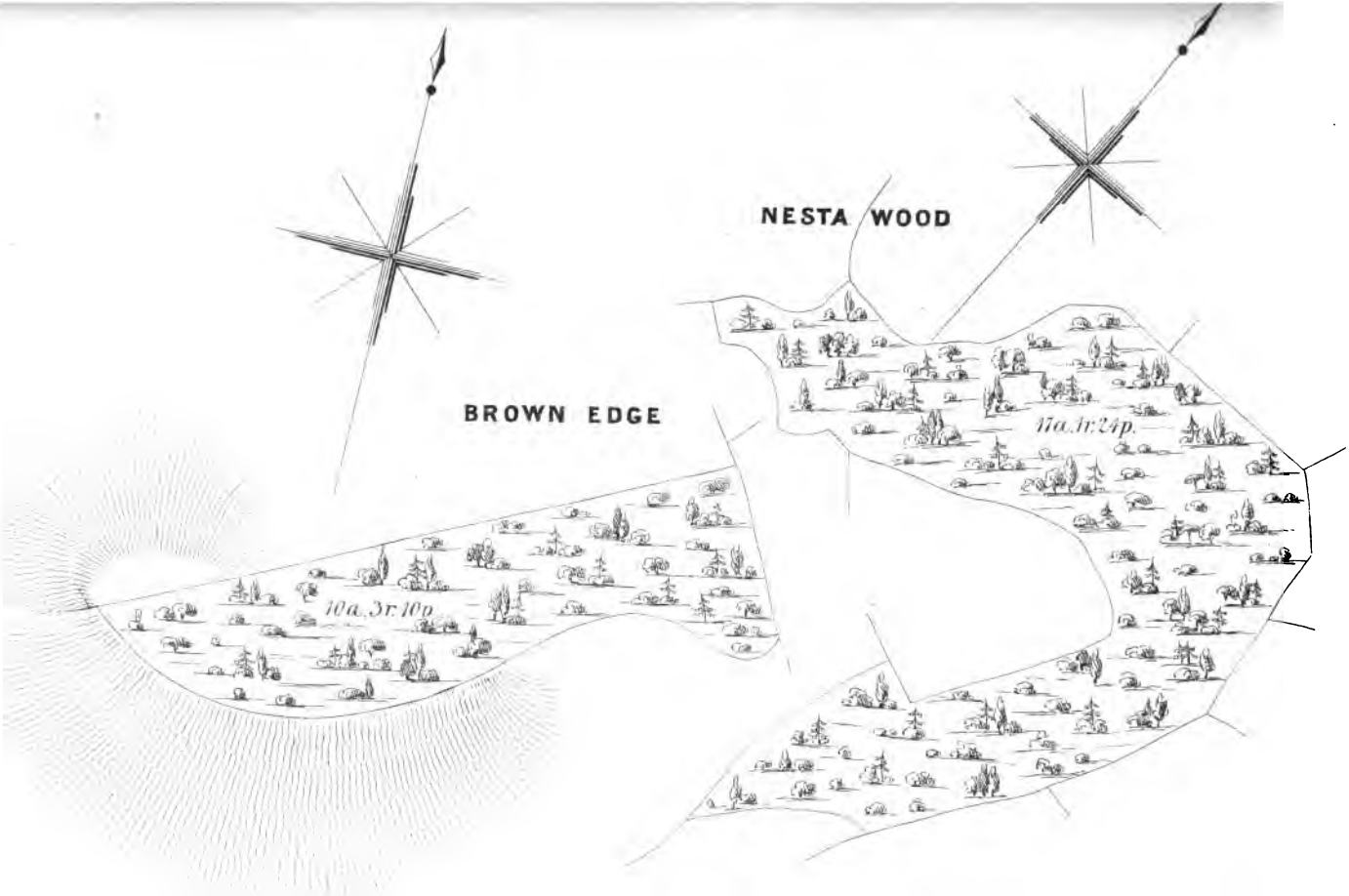

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steeps as bearing immediately on this part of my subject, belonging to his Grace the Duke of Devonshire, near Buxton, in the case of two of which, the Edge Moor and Corbar Edge plantations, I recommend a similar addition; and it is practicable (in the third, the Brown Edge, it is not necessary) by taking the breadth wanted for the belt, to be filled with ash and firs on the northerly aspects of the two steeps last mentioned, from the land adjoining. The Brown Edge is sufficiently protected on its northerly aspect by the overhanging ground of the Coombe's Moss moorlands.

I have given drawings of plantations, "steeps" and "levels" likewise, in several localities which are familiar to many of my readers—on the estate of his Grace the Duke of Devonshire, near Buxton and Fairfield; on the estate of William Tatton Egerton, Esq., in Whitle; and on the demesne of Glossop Dale; on lands belonging to Lord Edward

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Fitzalan Howard, M.P.; and of one on the Ollersett Hall estate; and have selected a few in each instance in support of my doctrine and my own practice in planting, with a view to profit from the timber when at maturity for felling, and to the convertibility of the site, if it be steep, gently sloping, or level, to pasture-land hereafter.

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NURSES.

Scotch and spruce firs, birch, and wych-elm, have for many years past been extensively grown as Nurses, and a great deal has been written on this subject in connection with planting, and on which every one holds an opinion and follows a practice of his own; and in expressing mine on the point in question I ask,—If a tree will bear singly, or in groups of five, six, ten, or a dozen together, the climate of the Low and High Peaks of Derbyshire, and, though slow in growth, will reach a maturity, size, and quality in our most exposed situations, and will rival and in many instances excel the same timber grown in a warmer and more favoured clime and

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situation, as I have been informed it proves to be by some of the most eminent calico-printers of my own time,—does it not seem a waste of plants to cramp such a tree in his infancy, youth, and manhood—in his progress—with a Scotch and spruce fir, birch, or wych-elm fraternity? And is it not better to let him *trust* to himself, giving him room to move in and to breathe in, and to *take care* of himself—as the ash will never fail to do on a northerly, or the sycamore on an easterly or westerly aspect,—and let him be the nurse and not the nursling, and allow him a few evergreen companions to bear him company, and to cheer the eye of the owner in a long and dreary Derbyshire winter, and oftentimes still more dreary spring?

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SHELTER.

This part of the subject brings to my recollection a visit I paid to "Blenheim" about fifty-two years ago, and our guide pointing out to us the several plantations in the park beyond the bridge, and stretching towards Ditchley, which he said were placed so as to record the position of the several brigades of the Duke of Marlborough's army in the field on that memorable day; I observed to him that their positions were admirably taken up, so as to defend the deer and other live stock in the park from the attacks, however sudden, of wind and rain from every quarter.

When the wind takes the direction of a

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valley, and woods and plantations are, by their situation, constantly exposed to it from the points of north-east or south-west, the consequences are destructive to the quality of oak timber growing thereon, for when sawn or prepared for building purposes it proves shaken. Instances of this I have known to have occurred in timber felled on such a site, as on the Beard estate, belonging to Colonel Cavendish; oak felled in the "Beard Wood" and "Ox Hey" plantations has, in many cases, proved shaken, while oak felled in "Beard Hall Clough" and "Shedyard Clough" has proved "sound as an acorn."

In the two former-named sites some of the oaks were sheltered, the ground being concave and convex, and the land being alternate deep clay and rock, the latter understratum being the roof of the coal lying ungotten on the southerly range of the "Beard Hall Farm," under which it lies in a "trough" rising east towards Shedyard, and again from

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"its dish" towards the west, where its roof rises towards "the day," and breaks out in ragged form in the "Beard Wood" and "Ox Hey" sites before mentioned, whereon sycamore, ash, alder, or any other timber without tap-root, would grow to perfection.

On all other parts of this estate the oak is sound and well-hearted, being sheltered from west, north, and east, by the township of Whitle and the adjoining township of Ollersett, the lower portion of which latter forms a bay and is protected by the "Bold Beard Farm," which, like a "mow cop" in miniature, stands "boldly" forth, and bids defiance to the winds from every quarter; and the oak grown on Colonel Cavendish's High Hill estate, and the Ollersett Hall and other farms in this township, is perfectly sound and well-hearted; and I sold a lot of oak for £500 some years ago, which Mr. Lewis Wyatt thought worthy of a place in the west wing of Lyme Hall, when he restored that noble

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edifice for my late lamented, kind, and steadfast friend, Thomas Legh, Esq.

Where there are no coppices or plantations to afford shelter to the stock grazing thereon from sudden storms of wind and rain or sleet, the simple plan adopted by our forefathers of placing two walls, from eight to nine feet high, in several situations, in any park or extensive enclosures, at angles, not too sharp to each other, is an admirable one. That the cattle, with their instinctive sensitiveness of a storm's approach, may have time to get under the influence of its shelter, each length of the wall should be proportionate with the number of cattle grazed on the land; and if the angle where they meet be too sharp, the weaker stock cannot so easily get out of the way of the jostling and horns of the stronger. The deposits of horned cattle left under such walls erected for shelter, attract and detain any flight of woodcocks which may drop in the night anywhere near them,

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and they continue to frequent them in the night when it is moonlight, and in the dark of the moon in the daytime, for boring and for food, until the first fall of snow drives them from the cover, which they have, during their stay with us, found refuge in.

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PLANTING AT PROPER DISTANCES.

This depends upon circumstances and upon the object intended. If a wood of forest-oak be raised from acorns, the distances from each other in the Crown forests of Northamptonshire, and in the woods and fox-covers in Lincolnshire, such as "Linwood Warren," Sir Arthur Aston's, or the Earl of Scarborough's extensive woods, a few miles from Tickhill, in Yorkshire, is about from twenty-four to thirty-three feet apart, and the rest of the land occupied as coppice-wood, of which latter each plant I should place not less than five feet apart from the other, in the choice of which regard must be had to the kind of timber which will suit your own market, and

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the purposes to which timber in its youth is applicable in your own neighbourhood.

In Staffordshire it would be "crate-wood;" in Surrey and many other counties the charcoal-burner, and in Norfolk and Suffolk, and other localities in various parts of England, the hurdle-maker and the hoop-maker and hop-grower would be your customers. But *with us* the strongest limbs and poles would be sold as post-wood for the collieries, while the rest, of lesser girth and dimensions, would find ready sale to the bobbin turner, the picking-peg turner, and the chemical liquid manufacturer; and for these uses, and for which we have an unlimited demand, I should recommend *sycamore*, *Spanish chestnut*, and *mountain-ash*, which might be raised from keys, nuts, and berries, in the manner hereafter described. You might then cut your coppice-wood in successive years, as it reached the proper age and size for your own market, as is done in other localities for theirs.

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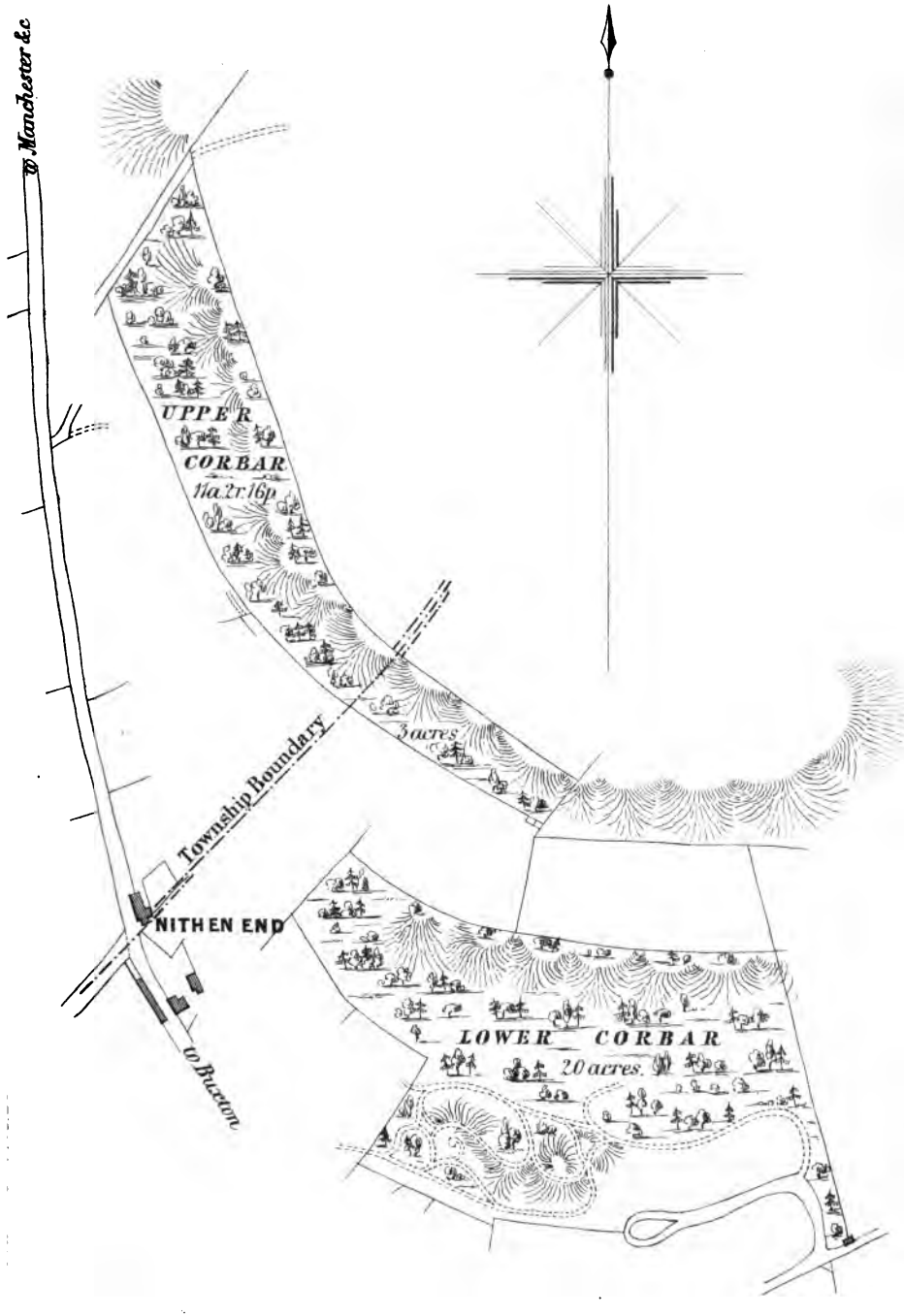

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DIBBLING.

THE simplest and cheapest mode of dibbling is, first, to burn the land intended to be planted in the spring, when the prevalence of an east wind admits of the heather being burnt, and it should be burnt effectually. Early in the autumn, before frost sets in, a sufficient depth of hole may be made with the dibbling-iron (No. 1), as used in sowing wheat, to receive two or three acorns; and in February or March following, as the weather suits, let chestnuts and the sycamore keys and mountain-ash berries be put into the ground in like manner.

But let the chestnuts be placed with the

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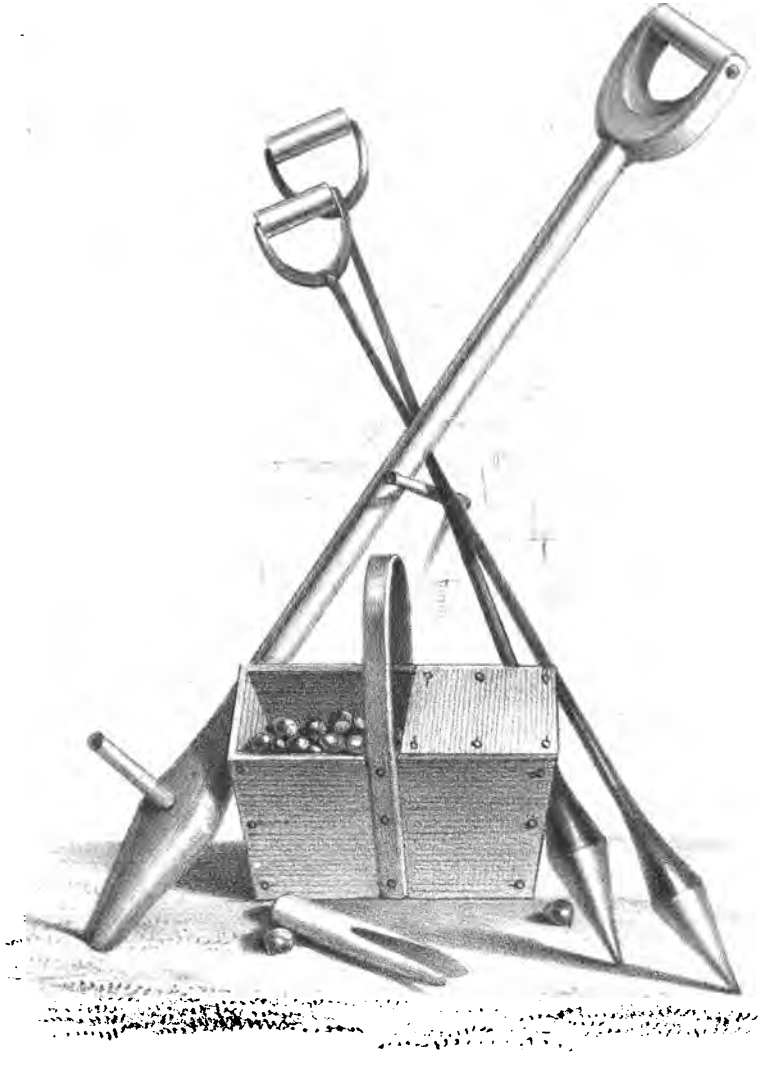

Vincent Brooks lith.

Implements to be used in dibbling in Acorns, Nuts & Keys.

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crown upwards, in a hole made by the larger dibbling-iron (No. 2). If the site of your intended plantation is difficult of access, let a half-load sack of acorns be placed on a "pilch," on a pony's back, and carried to the nearest spot that is accessible, from which let the child that follows the dibbler fill his hoppet (No. 3), and drop in one or two or three acorns, and the second child, with a small, sharp-edged hoe, cover the acorns up after they are dropped into the hole.

The weight of the dibbling-irons, of both sizes, in the hands of a strong man, will make a hole sufficient to contain the acorns and chestnuts, keys and berries, in any land and soil which is at all suitable for the growth of timber; and where the land is not so hard, the wooden implement (No. 4) will be the most handy.

The gamekeeper and *his staff* might be very usefully employed in this work, as the

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greater part of it would be in hand after the shooting season had ended, and the work of trapping vermin and destroying birds of prey requires the surveillance of the men on the moor-edge or woodland districts.

Of course the maturity of such timber or coppice-wood will not be so early as in a more expensive mode of planting, but it will be sure in the end; and it is practicable in situations where the expense of delving the ground, or making holes, and the price of the plants would deter the owner from planting, and is applicable to many situations of steep, rough, or dingle, which have never produced any rent or benefit whatever to him.

Forty oaks at thirty-three feet apart would be sufficient for an acre, to be left to grow for timber; at three feet apart, about 4840 coppice-wood plants would be required; at four feet apart, 4083; at six feet apart, 2722; so that the quantity of acorns, chestnuts,

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keys, and berries required, will be easily ascertained, and there are about 1000 or 1100 chestnuts in a peck of English growth.

The burning of the land in the previous spring will prevent the suffocation of the infant plants by weeds, when they burst their shell and draw their first breath in daylight, and the ashes into which they strike will foster the puny root and its morsel fibres.

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ON PRUNING.

In illustration of this part of my subject I copy the following observations from a small work, published in 1833, and now out of print:—

"If we examine and consider attentively the nature of a tree, it will be delightful to observe its power of adapting itself to its situation, and its strength to resist the winds,—its endeavours to repair any injury it may have sustained, and to fill up equally with its branches every airy and light space within its reach; and the beautiful proportion of its sprays, branches, limbs, and stem. The cutting away of the underboughs of trees is of

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the most injurious consequences, not only on account of the diminished means of forming timber occasioned by the number of leaves being lessened, and the incurable wounds inflicted, but also on account of the mechanical disadvantages a tree has when deprived of its balancing boughs in resisting the force of the winds.

"If we examine the effect of the wind on a perfect tree standing by itself, we shall be convinced how necessary the lower boughs are, and how impossible it is to cut or prune any part away without committing injury. A tree perhaps one hundred feet high, and nearly as wide across the lower branches, and covered with innumerable leaves, must have a wonderful power to resist or to evade a strong wind; its powers of *evading* are admirable. The leaves, for instance, are fixed on footstalks that give way, and the edge of the leaf only is presented to the wind; were it not for this provision, the strongest oaks, when in leaf,

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would be unable to bear a very moderate gale. The lower, or balancing boughs, through bending towards the earth, receive the wind upon their upper surfaces, and its effect on them is converted directly to support the tree; for the direction of the force of the wind is at right-angles with the surface it strikes, it therefore presses the limb next the wind towards the ground, and of course the stronger the wind blows, the firmer is the tree by these limbs held to the ground; and if these balancing limbs be all perfect, it is almost impossible the tree can be blown up by the roots; the stem would sooner be broken off above the balancing limbs. How much the stability of the tree is increased, too, by having its centre of gravity by these large and heavy boughs brought so near the ground! Although so amply provided with the power of evading the wind, yet it is sufficiently provided with strength to resist it.

"There is great reason to believe that the

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various curves and shapes of the stem, roots, and limbs, are the best possible for possessing the greatest strength. The direction of the forces the different parts of the tree have to resist, are not easily determined, or it would be easy to prove, by the common rules for the comparative strength of beams of timber, that the curves at the joinings of the roots and limbs to the stem, and the shape of the stem, roots, and limbs, are the best that could be devised for strength. A piece of timber strained with any force in one direction, should be deeper in the direction of the force than it is wide, in order to have the greater strength in the same piece; on this account joists for floors are much deeper than they are wide, because the force or pressure they have to resist is always in one direction; but if the pressure be applied not always in one direction, but at different times in different directions, the strongest shape would be that of a circle or cylinder: thus we see the trunks and boughs of trees round, the force they have to resist

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being as likely to attack them in one direction as another. Where the roots are fixed to the trunk, we find them in an *oval* shape, for here the pressure or strain is in one direction, caused by the leverage of the trunk of the tree; there is hardly a possibility of a strain being exerted on the roots on this part in any other direction than upwards and downwards, and we see the roots are most capable of bearing a strain in either of these directions."

Innumerable proofs may be brought forward that a tree has the power of adopting the shape that is the best possible for the situation it grows in; and if this be proved, what occasion is there for pruning?

In support of this I cite the following case in point:—"There is an ash-tree now growing on the Hedenham estate in Norfolk, which is estimated to contain fifteen loads of timber, or six hundred feet, according to the following measurement which has been taken of it:—

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Vincent Brooks lith.

Ash Tree at Hedenham, ~~Suffolk~~.

No. 11k

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At six feet from the ground it is twenty-three feet in circumference; at halfway up the trunk it is twenty-one feet in circumference; the length of the trunk is twenty-four yards; the lower branch, extending from the trunk, is eight feet in circumference, and contains forty-eight feet of timber; the upper branches contain fifty feet of timber; thus it is estimated to contain 'fifteen loads of timber.'"

This tree stands on the margin of the brook which flows through Ditchingham Park, which is feeder to its fine and highly ornamental sheet of water. At three A.M. on the morning of Sunday, the 7th of October, 1842, a terrific storm or hurricane of wind sped its destructive course with awful force and roar from the west towards the church and neighbouring dwellings at Hedenham, in Norfolk. Providentially it was not of more than a quarter of an hour or twenty minutes' duration. During its prevalence, by its velocity and strength, it carried off the tops of a large

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alder and an oak, carrying away both across the meadow in which they were growing. From the latter, which had a "twin crown," it blew one branch off it, measuring sixteen feet in length and sixteen inches wide across at the shattered end of it, into an orchard which was a very considerable distance, and which is only a few roods distant from the ash-tree in question, tearing up several large apple-trees in the orchard, and blowing over a haystack which arrested its course, and carrying away the chimneys on the top of the wheelwright's house adjoining, stripping off the entire thatched roofs of the dwellings situate near the church, tearing up a large poplar which grew close in front of one of them inhabited by a blacksmith and his family, but which providentially, in its almost instantaneous fall, only grazed the front of it, breaking all the windows and carrying away with it the wooden cornice of the roof; had it fallen on the building, the inmates must have perished; taking in its course six very

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large poplars growing in a row by the brook-side, and carrying all away, leaving only about four feet of their trunks in the ground, and tearing up nearly ninety oaks and other timber trees in the parks of the Hon. Mr. Irby, at Hedenham Hall, and the adjoining one of Ditchingham Hall, the seat of Colonel Bedingfield.

In its terrible and destructive course, which I have here attempted to describe, the ash-tree in question alike received its shock, the effects upon which were that the entire top of the tree, consisting of two large wide-spreading crowns, were instantly carried away, and two or three of its very large limbs, branching out from about the middle of the trunk and pointing towards the west, were so shattered as to require removal from the trunk immediately afterwards; but the other limbs resisted the fury of this tempest and still remain firmly attached to the giant trunk; and both the twin crowns of this noble

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tree, and its remaining protector-arms on the westerly side of it, have shot forth innumerable fresh branches in every airy and light space within its reach; and declares its power to repair the injuries it received in its throwing out, in beautiful proportion, its new sprays and branches and limbs.

In fine, this magnificent tree owes its escape from destruction in this awful gale, which was immediately succeeded by a deluge of rain falling in torrents for some hours, from its having escaped mutilation in its earlier days from the impious hands of "a pruner."

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PLANTATIONS IN GLOSSOP PARISH.

The plantations in this parish are chiefly those which belong to Lord Egerton of Tatton, in the townships of Mellor and Whitle; those on the Ollersett estates, Lord Edward Howard's Glossop Dale demesnes; and the several plantations on slopes, in dells and dingles, belonging to John White, Esq., at Park Hall. Few landowners of North Derbyshire have contributed more extensively, or shown more taste and judgment, than Mr. White, to the improving and enriching the aspect and general appearance of their localities, and in the cultivation of their estates and clothing them with wood and plantation. Mr. White has been his own landscape-gar-

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dener and planter from the commencement of the alterations and additions which he has so judiciously executed at this his family residence and estate. Although ornament must have been in a great measure an object with him in his operations and in his choice of his timber trees, especially near the hall and in the adjacent park enclosures, still he has not neglected the main chance (if I may so express it), for his covers and plantations abound with healthy oak and sycamore timber, which will doubtless be of great value, in due course of time, to his successors.

Lord Egerton of Tatton's plantations are on Mellor Moor, containing 22*a*. 3*r*. 25*p*., statute measure, which was planted nearly sixty years ago, on land then covered with heather, chiefly with larch and Scotch and spruce fir. They have been thinned during successive years, and those which remain have evidently ceased to grow, and are about to be felled and sold, and the ground when

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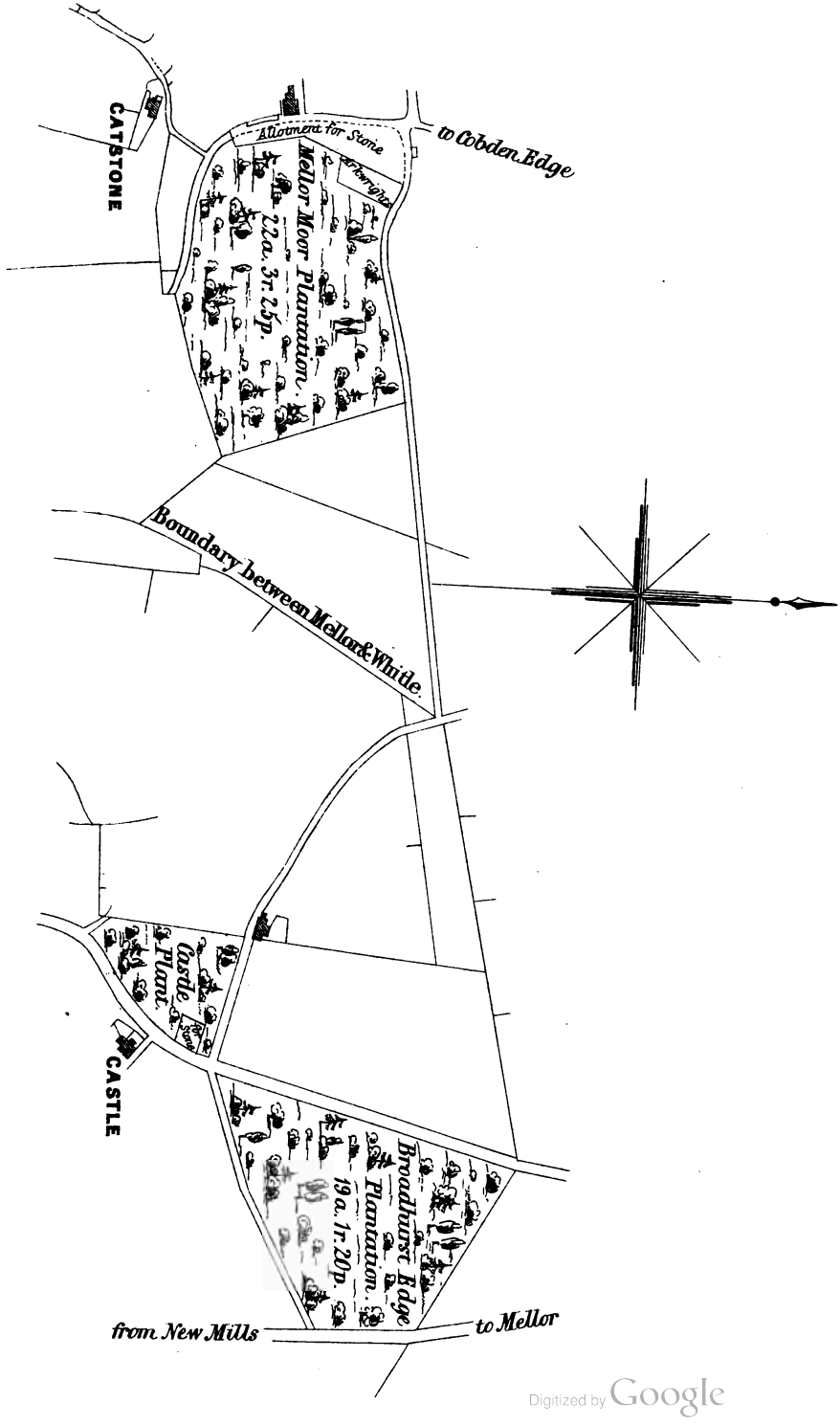

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cleared of the timber converted into pasture-land.

The Broadhurst Edge and the Castle Edges plantations were portions of the lands and allotments awarded by the Commissioner appointed under "The Whitle Inclosure Act," which was obtained in 1826, and the award signed in 1828, and have been planted about twenty-eight years, with a large proportion of larch and Scotch firs, and some oak, sycamore, and beech. A few years ago, and subsequently, from twenty to thirty thousand oak plants have been put in, which are in a most thriving condition; a small proportion of sycamore and elm and beech were planted at the same period, but have not made so great a progress as the oaks.

This is a beautiful site for the growth of timber, being a gentle declivity, with an eastern or "*morning* sun" aspect, and a good dry stone-wall fence all around it. This and

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the neighbouring lesser-sized "Castle Edge Plantation" were completed about twenty-eight years ago, and the ground was planted at my suggestion and earnest request made to its respected owner, the late Wilbraham Egerton, Esq., and executed by his instructions by his agent the late R. R. Lingard, Esq., my friend and schoolfellow, who solicited the "Whitle Inclosure Bill" through the Session of 1826, and also the "Ollersett and Phoside Inclosure Bill" through the Session of 1828, on both which occasions I accompanied him on his mission to Parliament, and remained with him until both of the Acts were obtained.

The plantations on the Ollersett estates were commenced about forty years ago, previous to the plantations in Beard being made by direction of the late venerable Earl of Burlington, who fixed on the sites to be planted when he paid his last visit in person to his estate in Beard. The Hollinhurst

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Clough Plantation was formed in part and principally by my predecessors, and I made additions to it for shelter on westerly, northerly, and easterly sides, about forty years ago. The rest of the plantations, completed about the same time, were so placed as to afford barriers against the storms of wind, hail, and rain which beset estates so exposed to the north and west as the farms in this township are. On the east it is otherwise. Ollersett Moor and Ollersett Pieces, the property of Miss Dewsnap, rising towards the east and sloping to the west, form a natural barrier against the dry east winds, or "Kinder winds," which are so prevalent, and for so many as six weeks continuously not unfrequently, in the early part of the spring, in North Derbyshire.

The plantations on the Glossop Dale estates are the "Castle Hill and Banks Plantations," and were planted previously to 1799 with firs and a very small proportion of hard-

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wood, and in that course of time have been replanted and filled up in various places. Both of these are sites and with aspects which, had they been planted and treated in accordance with my doctrines, would have contained some heavy unpruned timber,—ash and sycamore, with firs interspersed for variety and ornament,—in a progressive growth on their coming into the possession of their present noble owner. The Chunal Moor Plantation, containing seventy statute acres, was planted with larch and Scotch firs subsequently to 1799, soon after the late Matthew Ellison, Esq., succeeded Mr. Calvert in the agency of these estates, on whose accession and residence with his family at the Hall in 1799, the boundaries were perambulated between the Glossop Dale and Longden Dale estates, at which the present Michael Ellison, Esq., of Sheffield, was present, and who, with my relative James Newton, Esq., of Cheadle Heath, near Stockport, Chairman of the County Bench of Magistrates for that division, and

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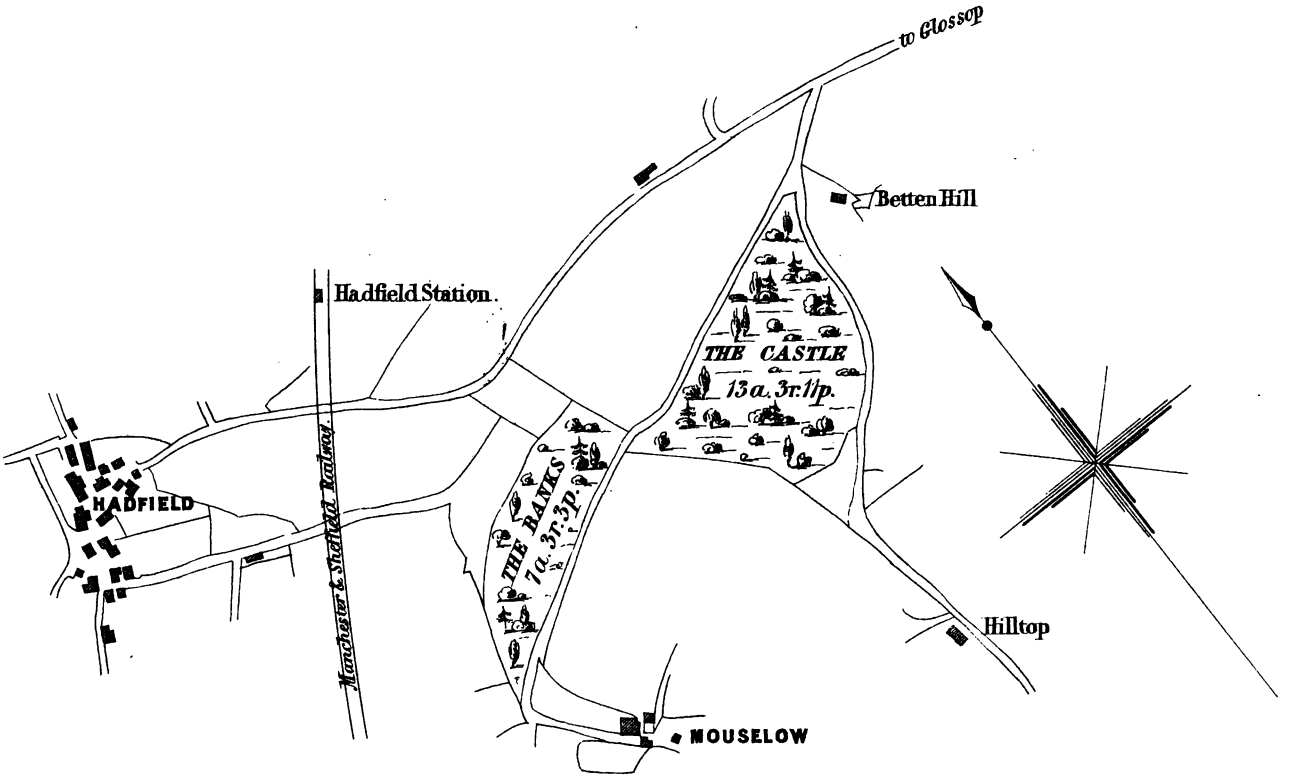

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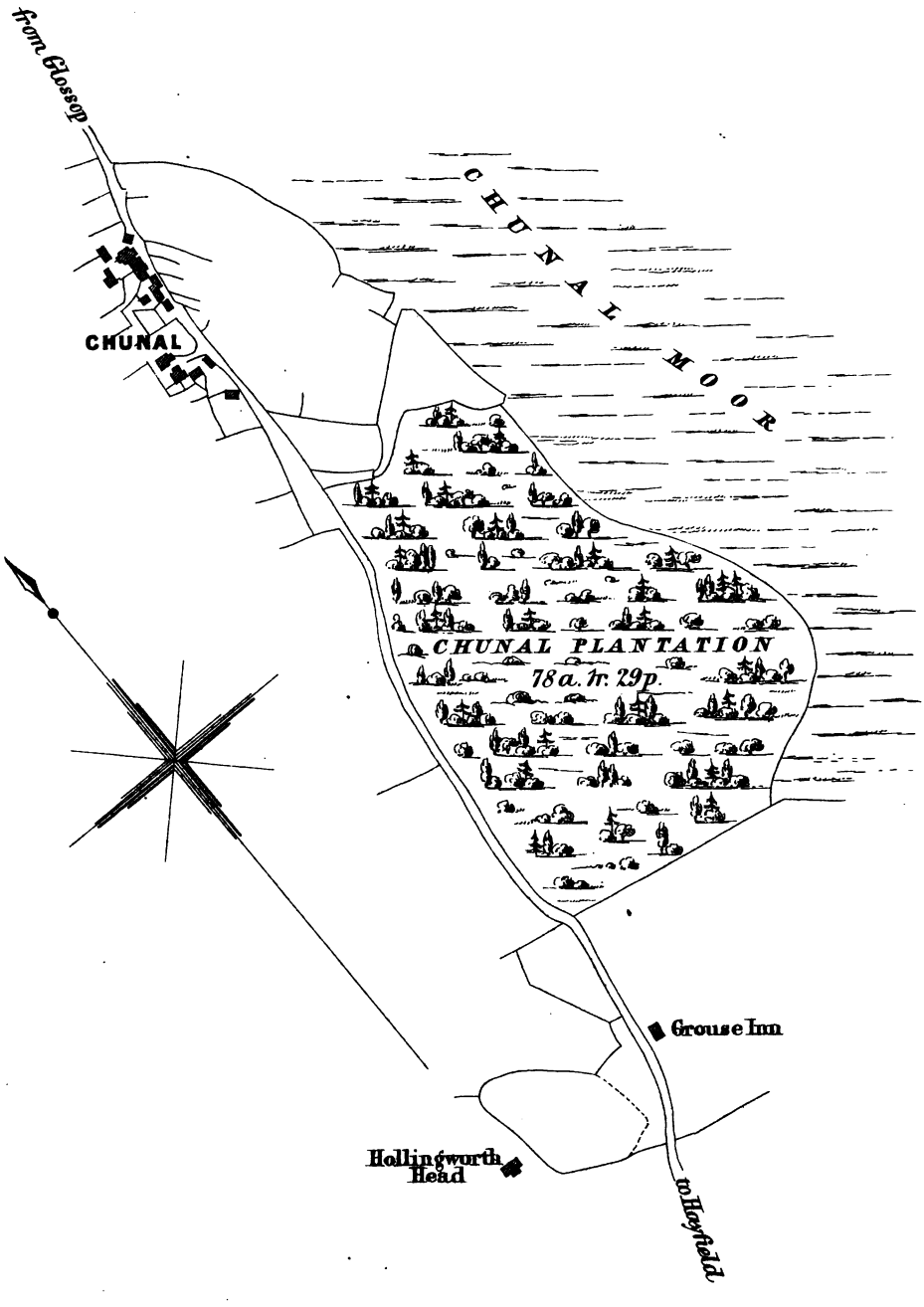

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myself, are the only survivors of the numerous party who were assembled on that occasion.

There was another plantation on a part of Chunal Moor, at Hollingworth Head, the site of which was covered with heather, and was planted as early, or probably earlier, than the Castle Hill and Banks Plantations; but the trees have long since disappeared from decay or by the axe, and a top-dressing of lime, applied as soon as the ground was cleared of the timber, has assisted in the decomposition of the roots of the firs,—in fertilizing the land, which is now a piece of excellent pasture.

The same course may hereafter be most advantageously pursued with the Chunal Moor Plantation, when its crop of larch and Scotch firs has reached maturity, or ceased to grow, and been removed, and the ground prepared for a similar mode of treatment as in the case of the Hollingworth Head Plantation just cited,

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and of the plantation on Mellor Moor before spoken of, and is about to be executed under the judicious management and agency of Mr. John Taylor, of Highfield, in Ollersett.

I adduce these cases in support of my recommendation to large landed proprietors, possessing wide extents of land covered with heather, where the soil is dry and the aspect south, or east with the morning sun upon it, to plant such with larch-fir only, giving them ample room to grow in; about one hundred and fifty larch plants would be amply sufficient for a statute acre, and pruned only with the blunt edge of the axe as the lower boughs decay. Before a century has passed away a son or a grandson may reap the benefit from the produce of the trees, and the increase of his rental from the site becoming pasture-land afterwards. There are many situations on noble and extensive demesnes which hold out the greatest encouragement to adopt such a mode of making land pro-

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ductive where the surface is covered with heather only; and though the returns may be far distant they are not less certain, if protected with a good dry stone-wall fence, and, in many cases, there are sufficient fences of such kind already existing, and the cost of plants of one year, well-rooted, would be moderate, if the order given to a Scotch nurseryman was a considerable one. So likewise are there many sites where my simple and economical plan of dibbling acorns and Spanish chestnuts on estates, which shows the feasibility and policy of such a practice in such examples as Arnicroft Wood, in Glossop Dale, at the westerly extremity, and lordly Shire Hill, as you approach the easterly range of it.

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STATE OF LANDS AND FARMS DURING THE LONG WAR.

FEW of the present generation of landowners can form any idea of the exhausted condition of the land in our own and the adjoining division of the county of Chester, during the continuance of the long war and at the close of it. The high price of grain, flour, and oatmeal, being nearly equal in price not unfrequently, and the latter in greater consumption among the middle and working classes than in the present day, was an encouragement to the tenant-farmer, to convert into tillage every part of his occupancy which would yield a crop of wheat and oats at from 10*s*. to 12*s*. and 15*s*. the bushel.

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To produce the former, all the manure of the farm was used in raising a crop of potatoes, to be succeeded by a crop of wheat, and in succession oats, and clover, and oats again. The meadow lands were starved, the only help which they received being the scanty deposits left by the flocks of sheep, called "Winterers," sent from the more elevated and colder districts by the sheep farmers of our own adjacent counties. To keep these in bounds during their sojourn with you until Lady-day, or from free quarters over your own entire township or the adjoining ones, would have been as practicable as to have held your tenants bound to the restrictive clauses of their lease against "over-tillage."

There was scarcely a farm which lay at a distance from any town from which manure could be carted, which was not utterly exhausted by such treatment on the part of its tenant as I have here attempted to describe. Lime, the best of all manure for

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raising a crop of wheat or of oats, was double the price it now is; and could only be obtained at enormous cost, from the Peak Forest Canal Company's wharfs, or by sending your team of three or four horses to the lime-kilns in Peak Forest, at three o'clock in the afternoon, and considering yourself fortunate if you saw it safe back again, and your carter sober, after his bivouac in dove-holes, at the same hour on the afternoon of the following day. The exactions levied upon you in those days, in tonnage and wharfage and canal dues; and by land, in a succession of toll-bars and concomitant weighing-machines; were grievous to be borne, and rendered it difficult for a tenant-farmer to do his land justice, where there was a desire in him to do so. There was one advantage at least in sending direct to the lime-kilns in Peak Forest for your lime, for you bought it by estimated loads, and you had what you paid for; whereas if you bought it at second-hand, and within a certain

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period of its being burnt, it became heavier in weight during the short interval while it passed from the retailer's cart into yours, from some chemical action which subsided very soon after its changing hands. Happily these obstacles are removed, and these odious exactions by land and water carriage become matters of history, like the monopoly of the East India Company, and are alike held in as fond remembrance by those who writhed under them, and have seen "the end of them."

Lime is now taken by railway and canal on reasonable terms, and the cost price per ton one-half less than in my time, by which many hundred acres of land in the adjacent counties of Chester and Lancaster are fertilized, large breadths of which were formerly sown with wheat on a summer fallow, with no other help than that received by the decomposition of the turf and exposure to the atmosphere. The superiority of lime as a

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manure for wheat and oats likewise is proved by the increased weight of the flour and meal produced from lands manured by lime, over that from lands after potatoes or any other green crop. And it is much to be desired that greater facilities existed than are already for increasing the supply and promoting further the application of lime as a means of fertilizing lands already in a state of cultivation, and of converting others out of cultivation into pasture. This might be accomplished, and I hope and believe there will in due time be a mode of introducing this valuable, and what ought to be a cheap manure, in localities which Providence has furnished with abundance of limestone on the one hand, and kiln-coal to burn the raw material on the other. By some such measures on the part of inviduals or in concert with others, as that contemplated soon after the accession to his title and estates by the late Duke of Devonshire, whose agents obtained a private Act of Parliament empowering the

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construction of a tramroad from the lime-stone field into the woodlands, but which was never taken advantage of, though the powers for making it may possibly still remain in force.

What a happy change has taken place since the return of peace, in England! The lands in our hilly districts are fast recovering or recovered from the former exhausted state, from the effects of time and rest; coltsfoot, thistles, and couch-grass, symptoms of beg-gary on the land, similar to those of poverty of blood in the human frame, are fast dis-appearing or no longer seen on the surface; and we enjoy this, among the other blessings of peace, without the conversion of our swords into ploughshares, of seeing our green-swards intact, while we with all others who toil for it can now eat untaxed bread—to quote the words of a great statesman.

The most disastrous times I can remember

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for the working classes was during the period of the Luddite riots, when for a short time wheat and oats alike fetched the enormous price of twenty shillings a bushel. This price I realized myself in Stockport market on two successive Fridays only,—as did the late Major Marsland of Henbury Hall, who at that time had a considerable extent of excellent land in Heaton Norris in his hands, which while under his management was a perfect model of a highly cultivated farm. And an extensive tenant-farmer under Lloyd Bampord Hesketh, Esq., who held two large farms near Stockport, at the same time sold one hundred bushels of cone wheat for one hundred pounds to a corn merchant in Stockport. But this price was soon considerably lowered by the produce of a new harvest coming more freely into the market.

During these eventful times, a great impoverishment of the land was occasioned by the demand of cowdung from the calico-

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printers, and the high price they offered for it caused it to be cleared from the pastures and meadows extensively. This practice is still continued, but, where permitted, bone-dust dressings, *pari passu*, should repair the injury. It is indispensable at the printing-works for fastening their colours; and the manure produced by horned cattle fed with any other provender than grass, corn, and hay, or otherwise than with simple food, will not suit their purpose.

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STATE OF NORTH DERBYSHIRE

AT THE CLOSE OF THE LAST CENTURY.

But in no case has a greater change and improvement been effected since the commencement of the present century, in North Derbyshire, than in its roads and bridges, which were originally adapted for travelling on the saddle or the pillion, and for conveyance of goods and merchandise of every description on the packsaddle. Some idea may be formed of the *gradients* of a public road and highway in North Derbyshire, for public traffic and convenience, by a walk up the Wynniatts from Castleton; or, after reaching the level, taking a stroll into Edale, by "taking

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the right," as soon as you get a little distance on the road, before you come to Peakshill. The bridges were of necessity widened at every point of communication with our neighbouring counties, when a new mode of transit for goods, and of travelling, was introduced, consequent upon the increase of population and immigration of hands of all ages for employment in the cotton mills and manufactories, established among, and in course of erection among us.

In my early days the late Samuel Frith, Esq., of Bank Hall, and Dr. Denman, of Stoney Middleton, were the nearest magistrates to Glossop Dale, on whom devolved all inspection of bridges and roads, with a view to their improvement. And at a very early date of the present century, I accompanied my father to Glossop Hall, by invitation to dinner of the late Matthew Ellison, Esq., in the month of August, when the heather was in full blossom, on the occasion

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of their visit of inspection of public highways, then under presentment to the Court of Quarter Sessions. The bridge at Glossop, at Howard Town, was at that time a "pack-saddle bridge," but was shortly afterwards widened and otherwise improved, especially as to its approaches, which were, on the Whitfield side, steep and inconvenient. The bridge in Ludworth, called Marple Bridge, from one of its haunches resting in that township, was likewise widened in its archway—and under the inspection of Samuel Frith, Esq., and colleague. Compstall bridge was widened and improved in its approaches at a more subsequent date; as were the approaches to Otterspool bridge, and the repairs and improvements necessary thereto. The bridge below it, lower down the stream, called "the new bridge," at the meeting of the townships of Stockport and Bredbury, which was of one arch only, and was considered the finest bridge of single span in England, was carried away by the great flood, on 29th of August,

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1799, being the same year in which the perambulation of the boundaries between the Longden Dale and the Glossop Dale estates took place. Broadbottom bridge also was widened and enlarged, with improved approaches, under Mr. White's and my own inspection.

The bridge called "Woolley bridge," which leads from Glossop Dale into the township of Hollingworth, was rebuilt under the inspection of John White, Esq., of Park Hall, and myself, during my residence at Taxall. The sole liability to the reconstruction of this bridge, of the county of Derby, having been proved to the satisfaction of the chairman (the late Lord Vernon) and Court of Quarter Sessions at Derby, orders were given for its being rebuilt under our inspection, and the plans and estimates, etc., furnished to us; my colleague however, on casting his eye over them, called my notice to one, which he at once detected as questionable. It was a sum

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of £350 more for furnishing driving in the piles, alleged as necessary to form a foundation for that half of the bridge which rested on the Hollingworth side of the river; and as the order was made by the Court, at the Michaelmas Sessions, and he was on the point of going to his hunting quarters in Leicestershire, he desired I would go over to the site in question and look into the case myself. In compliance with his wishes, I went immediately to a very worthy friend of mine, the late Mr. Henry Kelsall, of Hollingworth, who was up to the time of his death land-steward to Admiral Tollemache; and upon my telling him the object of my visit, and requesting him to accompany me to the bed of the river at the bridge (about a quarter of a mile distant), he replied, "I can save you that trouble. Some persons out of Yorkshire borrowed the Admiral's boring rods from me, and brought them back yesterday; and on my asking what they had bored through, replied, good hard marl, as good a foundation

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as needs to be." Of course my colleague and I stated all this to the Court at the next Sessions, and without notice or cavil with the county bridge Inspector or the contractors for building the bridge. The words *if necessary* were inserted in the specifications relating to the foundations of the intended new bridge. I must, however, do the contractor the justice to add that he performed the work satisfactorily, and within the time specified in the contract. And as all the parties concerned in this matter of county expenditure are long since defunct, the bridge remains a specimen of good faith and good workmanship in a bridge-builder. Though, thanks to the acuteness of my colleague, the amount of £350 and upwards for construction of a foundation was saved to the county.

I have only one more case of county bridge building to record: the bridge over the Goit called "Hague bridge," where the townships of Whitle, in Derbyshire, and Disley, in

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Cheshire, meet; the repair or rebuilding of which falls on each of these counties. The old bridge was also a packsaddle bridge, with its dangerous approaches on both sides, at right-angles, was so narrow as not to leave room for the drivers of the carts, and the battlements were eventually knocked off into the river by the collision of wheels of carts and carriages passing over it. Powers for rebuilding it on a wider scale and of an elliptic form of arch having been obtained from the Quarter Sessions of each county, and the matter entrusted to the late Thomas Legh, of Lyme, Esq., John White, of Park Hall, Esq., and myself; the plans and specifications were prepared (at my particular resquest) by the late Mr. Samuel Fowls, of Northwich, a most intelligent and valuable servant of the county of Chester for many years, for an elliptically arched bridge; and in the absence of one of my coadjutors on the Continent, and of the other in Leicestershire, the letting of the erection of the bridge by ticket devolved on

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myself single-handed, and took place at the Ram's Head hotel at Disley. More than a dozen tickets of bidders were handed into Mr. Fowls and Mr. Bodkin, the Derbyshire bridge inspector. On scrutinizing which, and the names of parties from whom they proceeded, I riddled them (to use a homely phrase) and let four remain. But observing to Mr. Fowls that the party whose bid was the highest was the only one I should feel satisfied with, acting, as I was, alone in the matter, I sent for the party into the room, and told him his ticket was the highest in amount considerably, and begged he would send in an amended one at the next round of bidding. To which he replied, "That he and his father and brothers well considered what they were about before they bid for any contract, and never lowered their bid made in the first instance; and he declined sending in a second ticket, observing that if floods or any casualties diminished their fair profits in such undertakings, they never asked to be indem-

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nified or reimbursed for their losses;" on which I said, "Then Mr. S——, you shall build the bridge; I accept your ticket, although it is the highest." This letting took place early in the year. The public convenience required the bridge to be finished before the winter.

The work was commenced and carried on with vigour, and the key-stones of the arch being on the point of being placed on the crown of it, when one of those floods in August, which have left such records of disaster in our valleys in times gone by, carried away the centres of the arch and all the mason-work raised on the timbers, leaving nothing but the foundations and haunches of the bridge; and yet the bridge was built within the time specified, and, "true to their words," Messrs. —— never asked for a shilling more from either county than the sum for which they contracted to build the bridge.

It is a poor consolation, when the contrac-

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tor for any work dies or becomes insolvent, for the opposite party to be told that the sureties are good; in case of death, delay and inconvenience frequently ensue. But where the work to be completed is one in which the health of a city is concerned by improved and enlarged sewerage of it and its environs, death and delay would go hand in hand together in such a summer as that of 1858, while suretiship is enforced, or a fresh letting is effected, to supersede one breaking down under a case of insolvency.

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APPENDIX.

I HAVE given the following extract from a work published in 1718 by Robert Bradley, Esq., F.R.S., with a quotation from Peter Bellonius, "De neglectâ Stirpium Culturâ:" "Agite, o adolescentes, et antequam canities vobis obrepat, stirpes jam alueritis, quæ vobis, cum insigni utilitate, delectationem etiam adferent," inscribed in its title-page, as well as the passages taken from a small work published in 1833, and now out of print, as corroborative of my own opinions and their practical results in my own case, and with the hope that the simplicity and beauty of their descriptions may soften down, as it were in painting, the tone and colour of my own:—

"Vegetation, in whatever degree I shall treat of it, is equally depending on the order of nature: whether I speak of trees, shrubs, or herbaceous

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plants, their principles are equally the same, that is to say, they all alike draw their nourishment by way of their roots, which nourishment is conveyed through proper vessels into the stem, the branches, leaves, flowers, and fruit.

"Now, that I may more easily explain by what means every plant receives and distributes its nourishment to the several parts of it, give me leave to draw a parallel between plants and animals, that thereby the nature of plants may be the better understood. . . . I shall proceed to explain, that the sap circulates in the vessels of plants as the blood doth in bodies of animals; and that this new system may be the better understood, I think it proper in this place to give a short description of the vessels in plants and their situation.

"First, then, the root of a plant is of a spongy nature, ready to admit into it such humid particles as are fitted (in the earth, by a certain temperature of air) to be received into its pores; and we may observe that the various qualities of different plants depend chiefly on the different

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size of the pores in their roots, by which they receive their several nourishments.

"Secondly. We must observe that the wood of every plant is composed of capillary tubes, running parallel with each other from the root (upright) through the trunk. Their cavities are so small that they are hardly to be discerned by the natural eye, unless in a piece of charcoal, cane, or oaken board. These vessels renew and augment themselves every year, as we may observe by cutting a tree horizontally, which will discover to us the latitudinal shootings and the annual additions of these pipes, and for which reason the trunks of trees increase in their circumference. These tubes, for distinction sake, I shall call arterial vessels, for it is through these the sap rises from the root in fine vapour, for their cavities are so small that it would be impossible they should admit anything whose parts were so large as those of a liquor.

"Thirdly. The passages or pipes by which the sap returns downward are much more open than the former, and are capable of receiving a liquor

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into them; these are placed immediately on the outside of the arterial vessels, between the wood and inner bark, and lead down directly to the covering of the root. They perform the office of veins, and contain the liquid sap which is found in plants in the spring and summer months.

"Fourthly. The bark of a tree is of a spongy texture, and by many little strings which pass between the arterial pipes corresponds with the pith; and—

"Fifthly. The pith is composed of little transparent globes, chained together in like manner with those bubbles which compose the froth of any liquor. In fine, a plant is like an alembic, which distils the juices of the earth; as, for example:—

"The root having sucked in the salts of the earth, and thereby filled itself with proper juices for the nourishment of the tree, these juices then are set in motion by heat, that is, they are made to evaporate into steam, as the matter in a still will do when it begins to warm. Now, as soon

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as this steam or vapour rises from the root, its own natural quality carries it upwards to meet the air; it enters then the mouths of the several arterial vessels of the tree and passeth up them to the top, with a force answerable to the heat that put it in motion. By this means it opens, by little and little, as it can force its way, the minute vessels which are rolled up in the buds, and expand them by degrees into leaves. But as every vapour of this kind, when it feels the cold, will condense and thicken into a water, so when the vapour which I mention to rise through the arterial vessels arrives at the extreme parts of them, *i. e.* the buds of a tree, it there meets with cold enough to condense it into a liquor, as the vapour in a still is known to do. In this form it returns by means of its own weight to the root down the vessels, which do the office of veins, lying between the wood and inner bark, leaving, as it passeth by, such parts of its juice as the texture of the bark will receive and requires for its support. It may be wondered at, that I have not taken more notice of the pith, which has been always accounted the principal part of a tree; to which I shall only answer at this time, that many

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herbaceous plants have not any pith, and that I have seen the trunks of large trees destitute of it, and they have yet continued to grow and to bear fruit; so that the order of vegetation may be explained without it; and indeed was I here to take notice of the several particulars in plants, I might swell this treatise into a large volume. . . .

"The motion of the sap continues in a plant so long as the sun's warmth can keep it in a fluid state; but it is condensed or thickened by a winter's cold, and is thereby changed into the consistency of gum, and being thus stagnated, cannot move any more till the warmth of the following spring or some artificial heat rarifies it into its former liquid state. It then renews its former vigour, and pushes forth branches, leaves, etc. But we must not suppose it is only the melted sap that was thickened in the tree during the winter which does that office of germination. The root has not been idle while the branches have stood still; it has not lost the moisture of the preceding autumn to impregnate and furnish itself with proper salts or nouriture, from whence the tree is to be maintained. Here is a supply laid in to

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furnish food for the summer, as some industrious animals will do to nourish themselves in the winter. In the next place, it may not be amiss to confute a common opinion, That the sap returns to the root in winter; for if it did so, how comes it that trees which are cut down in November and December will put forth branches and leaves the following spring, although they have no root or earth to feed them? This plainly shows that the sap is condensed or thickened in the tree during its circulative course by extreme cold, and remains in that gummy state till the warmth of the spring (as I have already said) liquefies it, and by the vapour which must then arise from it the buds are pushed forth, so long as there is matter remaining in the trunk sufficient to furnish them.

"And now since it appears from what has been said that plants have a circulation of sap, and proper means whereby to supply themselves with food, let us consider whether plants in their several kinds do not require different sorts of food one from the other, like various sorts of animals which differ in their diets. First, then, land animals may be likened in general to those plants

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which are called terrene, for that they live only upon the earth, such as Oaks, Beech, Elm, etc. Amphibious animals, such as the otter, beaver, tortoise, frogs, etc., which live as well on the land as in the water, may be compared to the willow, alder, minths, and such others. The Irish kinds, or aquatic race, whether of the rivers or of the sea, are analogous to the water-plants, such as water-lilies, water-plantains, etc., which only live in rivers or fresh water; or the fuci, coral, coral-line, etc., which are sea or salt-water plants, and not any one of those will live out of its proper element.

"From whence we may conclude how improper it would be to plant a water-lily in a dry, sandy desert, or an oak at the bottom of the sea, which would be just as unreasonable as if we should propose to feed a dog with hay or a horse with fish. However, this rule of nature has been so little observed by some of our greatest planters, that we can hardly boast of good success in one out of five plantations that has been made.

"But I shall beg leave to remark still further,

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that as the several land animals have their respective diets, so have the terrene plants likewise their several soils from whence they draw their nourishment. As some animals feed on flesh, others on fish, roots, leaves, grain, or fruits, so do we find that some plants love clay, others a loam, sand, or gravel. Nor is this all we ought to observe. We must consider likewise how beneficial to every plant is a right exposure, whether in a vale, the sides or tops of hills exposed to the south or north winds, whether inland or near the air of the sea; for it is a proper air that keeps a plant in health and fits it to receive its nourishment; and a certain degree of warmth, peculiar to each kind of plant, is likewise worth our inquiry, for it is a warmth natural to each plant that puts its juices into their proper motion, as the same degree of heat will not melt every kind of mixture."

TOR TOP ESTATE.

This formerly belonged to the ancient family of the Bowers, of whom John Bower was the

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last male representative and owner of that and other family estates in Bowden Middlecale. By his marriage with Mary Needham, of Rushop, he had issue one son, John Bower, who died December 28th, 1756, under age, and one daughter, Sarah Bower, who, on her father's demise, succeeded to all his real and personal estates, which were very considerable. She died in the prime of life, unmarried.

> "Disappointment, like a worm in the bud,
> Had fed upon her damask cheek."

For she possessed great personal attractions. She bequeathed the whole of her landed and personal property to her mother, who survived her, and at her decease it passed into the ancient and respectable family of the Needhams, of Rushop and of Perry Foot, at which latter place the family has descended in regular succession from the reign of Charles II., in the names of Robert Needham, until the decease of the last member of that family of that name, which took place in 1844.

The family residence at Tor Top still remains, and the surrounding lands, now in the occupation of and forming part of the extensive calico-

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printing works of Charles Yates, Esq., "overhang the Tor" on three aspects, east, south, and west, through which, after its conflux with the stream flowing down from the Kinder, "the Goit" pursues its course. This ravine, from its sylvan beauty, the stately timber which adorned its brows, was named "Little Matlock," and the view from the residence southward was one of great beauty and extent and variety of scenery. On its right, the Wirksmoor Wood, extending over a number of acres, spread itself widely from north to south, and was first invaded by the passage of the Peak Forest Canal through it; and in a few years after it was felled to the ground *en masse*, with the exception of two remnants which still remain at each extremity of it, by the father of the present "Francis Joddrell, of Yeardsley, Esq., his youngest son surviving," and the large extent of acreage which it once covered has for many years past been occupied as meadow and pasture land, and has continued to furnish sites for mills and dwelling-houses, railways and railway-stations, canal wharfs and warehouses, and a straight and broad turnpike-road affording an approach to all of these.

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The story of Sarah Bower is a melancholy one. She inherited a considerable personal property, and many good estates within Bowden Middlecale, in addition to the Tor Top estate, and several farms in its vicinity. She was a remarkably handsome person, and received attentions from many "would-be suitors;" when "in an evil hour," during the sojourn of her mother and herself at Buxton in the summer months, a gentleman apparently, of good manners and prepossessing exterior, who was a visitor in the place, obtained an introduction to Mrs. Bower and her daughter, which led to an engagement and proposed matrimonial alliance.

While matters were thus proceeding, and as the summer advanced, the northern summer circuit was near approaching, and some three or four barristers, who were on their way to York assizes, took Buxton *en route* after their toils during term, for the baths and the bracing air of our limestone highlands. On taking their seats at the *table d'hôte* of the hotel where Mrs. Bower and her daughter were inmates, they recognized in the person of "the accepted suitor" a "*roué*

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of the first water," well known among the gentlemen learned in the law and about the Inns of Court in London, and who, among other appointments and occupations, had once filled that of "a Judge's Associate," or some other confidential employment which brought him into personal communication with one of our "highest legal functionaries." They inquired of the Duke of Devonshire's agent of that day who this elderly lady and her strikingly handsome daughter were, and exposed the scoundrel who was in their company.

This unhappy affair produced too strong an effect on her wounded feelings and on her mind; and the shock of such a discovery, and blighting of her future hopes and happiness, she was unable to bear, and it brought on decline and its fatal consequences.

The head of the other branch of this family was George Bower, the uncle of Sarah Bower's father, John Bower, who married Ellen Andrew, the sole heiress of a wealthy landowner of that name, in the hamlet of Thornsett, which branch

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likewise will become extinct on the demise of the narrator. In the former case, the last branch was blighted and withered in its prime and strength of growth and beauty; in the latter, it will have dropped off from decay and age, like the leaves in winter.

THE END.

JOHN EDWARD TAYLOR, PRINTER,
LITTLE QUEEN STREET, LINCOLN'S INN FIELDS.

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5, Henrietta Street, Covent Garden,
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MR. REEVE'S
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